The RUBBER AGE

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LATE NEWS of the Industry

Rutherford Assails Tire Price Cuts As Unwarranted and Harmful to Trade

ASSERTING that the recent tire price reductions were not demanded by the public and that their only effect would be to destroy the manufacturer's chance for profit and impair the organized system of dealer distribution, W. C. Rutherford, president of the Pennsylvania Rubber Company, Jeannette, Pa., issued a statement on June 16 to point out what he believes are the dangers of this move. The price cuts were inaugurated by the Goodyear Tire & Rubber Company on June 5, following the seasonal announcement of mail order house reductions, and all other manufacturers followed suit shortly afterward.

"Tire prices are so low that the rubber industry is earning less than one per cent on its invested capital," declared Mr. Rutherford. "New low prices practically annul what little chance the industry has to make even the vestige of a respectable showing in 1930.

"Of course, the expectancy is that a stimulus in demand and greater volume will compensate for the downward revision of prices. This I cannot see. Tires are a staple commodity bought when necessity demands, seldom before.

"There is no public demand for lower prices. Nor is there any public opinion that prices are too high. Consequently, the reduction in prices will bring no rush of buyers into the market. There is no new field to absorb the additional volume needed to enable the industry to earn an amount equal to that before the new price schedule became effective.

"The serious phase, from the public standpoint, is the further impairment in service. Thousands of tire merchants have been forced out of business in the past few years because manufacturing competition for tire volume has become so intensive that they have been unable to survive in the face of methods and prices. Many who are still in it, just hanging on and making no money, will abandon tire selling for more attractive businesses. The result will be not only that men will be deprived of a right to survive in a business they like, but that far fewer outlets will be available to the motoring public for the purchasing and servicing of tires.

"The automobile is the outstanding means of transportation. As its usage increases, which is inevitable, the organized system of servicing it naturally should increase. That would mean that instead of having fewer tire merchants we should have more. Quite the reverse is true. The number of tire merchants in business is diminishing rapidly, alarmingly so. Therefore methods and expedients injected by manufacturers to serve their own interests not only seriously impair the service structure of the industry but expose its leaders to criticism of shortsightedness.

"It is the industry's duty to perpetuate and strengthen tire and dealer service to the public, not weaken it. By greater efficiency within its own factories, by able administration and sound, sustained policies, it can do a double service—produce tires economically for the public and strengthen and broaden dealer service to that public.

"Unwarranted tire reductions do not build business; they injure it."

United States Rubber Consumption Totaled 39,902 Long Tons During May

CONSUMPTION of crude rubber of all classes by manufacturers in the United States in the month of May is estimated at 39,902 long tons, according to statistics compiled by the Rubber Manufacturers Association. This compares with estimated consumption of 40,207 long tons in April and 49,233 long tons in May, 1929. This report for last month was considerably lower than previous predictions by the trade, which ranged from 44,000 to 46,000 long tons.

Imports of crude rubber of all classes into the United States during the month of May totaled 40,745 long tons according to estimates issued by the Rubber Manufacturers Association. This compares with the association's own estimate of imports of 49,927 long tons in April, and with 49,180 long tons in May, 1929.

Consumption of reclaimed rubber is estimated by the association itself at 17,473 long tons for May as compared with 17,321 long tons in April and 22,286 long tons in May, 1929.

The association estimates total domestic stocks of crude rubber on hand and in transit overland on May 31 at 146,179 long tons compared with 148,272 long tons as of April 30 and 97,192 long tons as of May 31, 1929. Crude rubber afloat for United States ports on May 31 is estimated at 68,168 long tons as against 63,261 long tons on April 30 and 65,793 long tons a year ago.

Captain Dick Grace being hurled from his car in a test of General tires

General Tire & Rubber Company Plant Reported Operating at Full Capacity

REPORTING the factory of the General Tire & Rubber Company to be operating at capacity, William O'Neil, president, on June 4, called attention to his prediction, made at the beginning of the year, that 1930 will be the best year in the history of the tire replacement business. The General company manufactures tires exclusively for the replacement trade, not furnishing tires for original equipment to automobile manufacturers.

"Our company did a larger volume of business in May this year than in the same month last year," Mr. O'Neil said. "Our volume of unit sales during the month was cinsiderably larger than in May of last year, and our dollar volume was also somewhat larger. This is particularly significant in view of the fact that May last year was the second largest month in volume of business in the history of the company.

"While business in March and April was slightly below the marks set during the same months in 1929, June has started out with all indications that it will break records for volume of business over that done previously in any similar month in the company's history. I feel confident that the next few months will thoroughly establish the truth of the prediction that 1930 will be the best year in the history of the replacement tire business.

"Our plant is running to 100 per cent of its capacity. During the recent business recession, it was necessary to work shorter hours for a time, although we did not discharge any men."

The General Tire & Rubber Company recently tested its Dual balloon 8-ply casings by having Captain Dick Grace, motion picture driver, crash into a thick wall of brick and concrete at a speed of 37 miles an hour. Although receiving the full force of the impact, which tipped the heavy wall forward, the tires withstood the shock successfully. Motion pictures were taken of the test for publicity purposes, and it is being featured in the company's current newspaper advertising.

Name Northern Rubber Company Receiver As Step Toward Reorganization Plans

FOLLOWING the filing of an involuntary petition in bankruptcy, W. P. Welker, trust officer of the Ohio State Bank & Trust Company, was named as receiver for the Northern Rubber Company, Barberton, O. The petition was filed with Judge L. S. Pardee in Common Pleas Court, who made the appointment of Mr. Welker on June 16.

The bankruptcy proceedings were started by the Barrett Company of Cleveland, which recently was given a judgment of $278 against the Northern Rubber Company in Barberton municipal court, and the petition was filed with the consent of the officers of the rubber company. Assets of the Northern company are said to be $300,000 and liabilities $200,000.

In a statement issued when the petition was filed, J. L. Schott, president of the Northern company said the bankruptcy proceedings were a step in the reorganization being planned. He said that present assets exceed liabilities but that recent operations have been unprofitable. Mr. Schott declared plans were being made to put in new capital, purchase more equipment, and expand the business to include manufacture of goods besides tires.

The Northern Rubber Company was incorporated in 1923 and has been manufacturing casings and tubes under the brand names of Northern Luxor, Biltwell and Norwell. The capacity of its Barberton factory is more than 100,000 casings and 125,000 tubes annually.

Proceeds From $30,000,000 Note Issue Enable Goodrich to Retire Bank Loans

THE proceeds from the sale last month of $30,000,000 of convertible debentures have put the B. F. Goodrich Company in a position to liquidate $21,500,000 of bank loans and other obligations and to retain a substantial amount of cash for working capital, according to J. D. Tew, president. A new pro forma balance sheet as of December 31, 1929, giving effect to the changes, shows current assets of $100,118,334 against total current liabilities of $10,452,554, a ratio of nearly 10 to 1, leaving working capital of approximately $90,000,000.

The chief feature of the new statement is the elimination of the item of $28,831,932 for bills payable, although the figure of $2,181,932 is retained for "bills payable, subsidiary companies." Cash is figured at $13,323,565 as compared with $12,073,566 in the pro forma balance sheet issued immediately after the Miller acquisition in February. The surplus, however, shows a drop from $25,747,524 to $23,647,523 in the new statement. The company is said to have been enabled to carry out a wide program of expansion of production in the future.

"The demand for mechanical rubber goods, such as belting, is large," said Mr. Tew. "There is an active demand for rubber footwear and an increase in demand for druggists' sundries and for toys. Demand for tires should improve with good weather, and with deferred dealer demand that is bound sooner or later to come into the market."

He added: "The Goodrich company has long been a diversified manufacturer. Tires, while the chief tonnage item of Gooorich, do not represent as high a percentage of the total sales as is the case of most other large companies.

"With the acquisition of the Hood company, Goodrich now has a well rounded out footwear business, with outlets through all classes of trade. While Goodrich had for years been producers of druggists' sundries, they had never entered the field of toys and novelties. The acquisition of Miller places Goodrich in a still better diversified position, especially with respect to specialty goods and druggists' sundries."

Pro forma consolidated balance sheet of the B. F. Goodrich Co. as of December 31, 1929, (after giving effect to acquisition of the Miller Rubber Co. and subsidiaries, the application of the proceeds of sale of $30,000,000 fifteen-year 6% convertible gold debentures to the reduction of current indebtedness or to the increase of current assets, the retirement of 11,880 shares of preferred stock held in

the company's treasury and the increase to 4,000,000 shares in the company's authorized common stock) follows:

Assets: Real estate, buildings, machinery and sundry equipment, less reserve for depreciation and obsolescence, $74,922,267; cash, $13,323,565; accounts, notes, etc., receivable, $36,588,646; inventories, $50,506,123; due from employees on account of purchase of common stock and treasury common stock, $161,385; securities of subsidiary company purchased for sinking fund requirements (at par), $188,000; 47 shares of 7% cumulative preferred stock in treasury, at par, $4,700; investments, advances to other companies and receivables from sale of investments, $2,399,873; deferred charges, $1,921,012; total, $180,015,571.

Liabilities: 7% preferred stock, $31,532,000; common stock, (represented by 1,167,142 no-par shares), after exclusion of intangible capital assets, namely, patents, trademarks, and good-will amounting to $57,798,001, is stated at valuation of $39,871,379; bills payable, subsidiary companies, $2,181,932; accounts payable, $6,172,915; sundry accrued liabilities, $1,383,187; federal tax reserve, $714,423; mortgages and land contracts payable (subsidiary companies), $95,713; funded debt, $51,572,000; bonded indebtedness and debentures of subsidiary companies (less in treasury), $12,152,640; contingent reserves, $6,749,609; other reserves, $969,003; minority stockholders' interest in subsidiary companies, $2,504,721; employees net credits on subscriptions to 78,750 shares of common capital stock, $468,426; surplus (including profit of Hood Rubber Co. Inc., and subsidiaries only since date of acquisition, August 30, 1929), $23,647,523; total, $180,015,571.

This balance sheet does not take into consideration the capital asset of good-will amounting to $57,798,000, nor the patents or trade-marks carried at $1, but shows the condition of the company on the basis of tangible capital assets.

April Output of 6,024,045 Casings Was the Highest Since July, 1929

PRODUCTION of pneumatic tires and tubes by domestic manufacturers during April reached the highest total for any month since July, 1929, according to statistics compiled by the Rubber Manufacturers Association, Inc. The output of balloon tires and tubes was the heaviest in history, with the exception of the record four months from March to June, 1929, but the low number of high pressure casings turned out held down the total production figure. While slightly above the March output, the April production of high pressure casings was lower than for any other month since early 1921.

Tire factories in the United States produced a total of 6,024,045 pneumatic casings during the month of April, according to the estimates issued by the Rubber Manufacturers Association. Total production of inner tubes is estimated at 5,877,373 and total production of solid and cushion tires at 23,113 for the month. Solid and cushion tire output was the lowest in years.

While this output of casings represents an increase over the March total of 5,187,970 units, it is still considerably below April, 1929, when 7,883,805 casings were turned out. Shipments were again lower than production, and inventories, therefore, gained slightly over the figure for the end of March. Total shipments are estimated as follows:

Pneumatic casings, all classes	5,429,096
Inner tubes	5,171,596
Solid and cushion tires	32,309

Inventories as of April 30 are estimated at 13,948,277 for all pneumatic casings; 14,703,614 for inner tubes, and 155,460 for solid and cushion tires. The solid and cushion tires again proved an exception from the course of other tires during April, experiencing a lower production, higher shipments and a consequent reduction in their inventory.

The tire industry is estimated to have consumed 68,202,484 pounds of crude rubber and 23,018,617 pounds of cotton fabric during the month of April in the manufacture of all types of pneumatic casings, tubes and solid and cushion tires.

The association's estimates are based on reports furnished by manufacturers who produce approximately 75 per cent of the total for the United States, but have been adjusted to represent 100 per cent in the above figures.

Good Planning Reduces Unit Costs, Richardson Tells Management Assn.

THAT the evils of hand-to-mouth buying can be overcome and unit costs successfully cut by intelligent planning, was told to the production conference of the American Management Association at the Hotel Statler, Cleveland, O., on June 9 by W. S. Richardson, staff superintendent in the mechanical division of the B. F. Goodrich Company.

"There is ample evidence to show that total unit costs in rubber factories are reduced wherever good planning is exercised as a function and that the savings in these unit costs as a result of planning are more, by far, than the increased cost of overhead represented by the planning departments of the various companies or the increased costs of overhead as believed to exist as a consequence of hand-to-mouth buying," Mr. Richardson stated.

"Today, in the B. F. Goodrich Company, there is a consolidated department of 107 people handling 15% more orders than were handled previously by 171 people. The service to customers and branches is much improved, both from the point of view of speed and accuracy.

"To deal with the second problem presented by hand-to-mouth buying, namely, rapid changes in the rate of production, the B. F. Goodrich Company met with marked success by taking some of the savings made by organizing the service department and setting up a separate group known as the production control department, consisiting of five people to do staff planning work, while the line planning is taken care of by the service department.

"Specifically, the job of the production control is to establish the rate of production within the various production departments and to notify the service department of the required rate. They have the sole responsibility for the raising and lowering of this rate, the objective being to keep the production rate as uniform as possible, and in any event have the production curve rise slowly and fall slowly—avoiding the peaks and valleys.

"In addition to the production control department, there is a raw materials planning division whose duty it is to take the forecasts of the production control and turn them into terms of raw material and to release to the purchasing department such quantities as are consistent with the forecasted rate of production as put out by the production control, the raw materials planning division having full responsibility for the size of the raw material inventory.

"Too much money can be spent in the planning department by refining methods too closely. After all, the object is to provide a steady flow of work to the employee of the desired kind represented in expressed obligations to customers, and to see that this is performed efficiently. Sometimes management ties too many 'do-dads' to its coat tails which careful investigation will prove cannot justify their costs.

"Essentially, there is nothing done in the planning section of the service department which could be eliminated without raising costs or affecting the quality of the delivery service."

(Other news of the industry will be found on Pages 321-327)

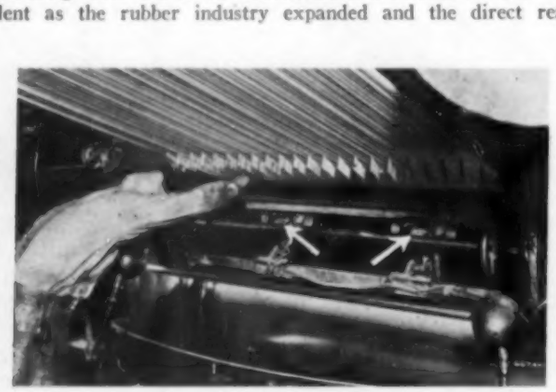
A Group of Foxboro Instruments and Republic Flow Meters at Hood Rubber Co. Plant

Modern Developments in Control Instruments for Rubber Factories

By L. J. D. HEALY
Fisk Rubber Co., Cudahy, Wis.

SINCE vulcanization of rubber is so dependent upon time and temperature, the rubber industry from its inception has required some controlling apparatus. The early controls were probably rather crude, consisting in the most part of the clock, steam gauge and measuring stick. As time went on and manufacturing units became larger, the need of more accurate measuring devices become apparent. Thickness gauges came into use and thermometers augmented the steam gauge. It is well known how the simple Randall & Stickney type of gauge originally developed for measuring the thickness of paper lent itself with slight modification so admirably to the gauging of rubber stocks.

All of these simple measuring devices so far enumerated, depended upon the human element for reading. The necessity for overcoming error due to the human element became more and more evident as the rubber industry expanded and the direct reading



A Close-up View of the Magnetic Gauge Controls (indicated by arrows) used in maintaining a Uniform Deposit of Gum (Photo courtesy Fisk Rubber Co.)

thermometer was supplanted by the automatic recording thermometer which kept accurate record of temperatures. It was only a short step from the automatic thermometer to the other recording devices for giving us continuous record of steam, air, hydraulic pressure, etc., or wherever permanent records might be useful for better control purposes.

Until the last decade, the rubber manufacturer has been more or less satisfied with the recording type of instrument, and in many cases still depends only upon inspectors and foremen to check time, temperature, etc. However, with the rapid development of accelerators and shorter cures, these methods of control proved inadequate and need for automatic control became more and more apparent.

Within still more recent years, the large mass production and speeding up of operations has made the employment of automatic devices a necessity. So rapid has been the progress along these lines during the last few years that the development of control devices has scarcely kept pace with our needs, and we find ourselves today sadly in need of more accurate control of many of our manufacturing operations. This is especially true in regard to our milling and calendering operations, where we are still too largely depending upon the human element.

The continuous processing of rubber stocks as required for present day mass production makes it imperative that these conditions be improved upon. One such process which I have especially in mind, is the continuous coating of cord fabric with rubber, the cords leaving the creel room where they are formed into a weft, then passing through drying chambers they meet the rubber on the calender rolls. The rubber meanwhile has been compounded, milled and conveyed by conveyors to where it meets the fabric on the calender roll. The cotton cords are here covered with rubber, pass over a weighing device, are cooled, rolled and delivered to the cutting room for the next operation. This entire operation, from the crude rubber to the cutting room, is approximately only 20 minutes for this complete portion of the cycle. This operation being continuous requires very careful control of such factors as humidity, temperature, plasticity, tack, etc. Since the operation is carried out at a speed in excess of 2,600 yards an hour, it means that plasticities, roll temperatures, gum deposits, etc., be maintained absolutely uniform. The variation of only a few degrees in temperature is often enough to throw the entire operation out of step, since a definite speed must also be maintained to properly synchronize the various conveyors.

This is merely an illustration of the need for maintaining continuous automatic control of stock temperatures, both in the mixers and on the calender. At the present time this is done by auto-

Editor's Note: The above paper was presented at the Chicago Group Meeting, Rubber Division, A. C. S., January 17, 1930.

matic recording devices on the internal mixers and on the steam and water lines of the mills and roll surfaces of the calenders. It is desirable that we carry this work still further and develop automatic control of the various units in such process.

I have cited just a few instances where control devices are so necessary for satisfactory functioning of equipment and could continue on throughout the entire sequence of operations to the final vulcanizing and finishing processes.

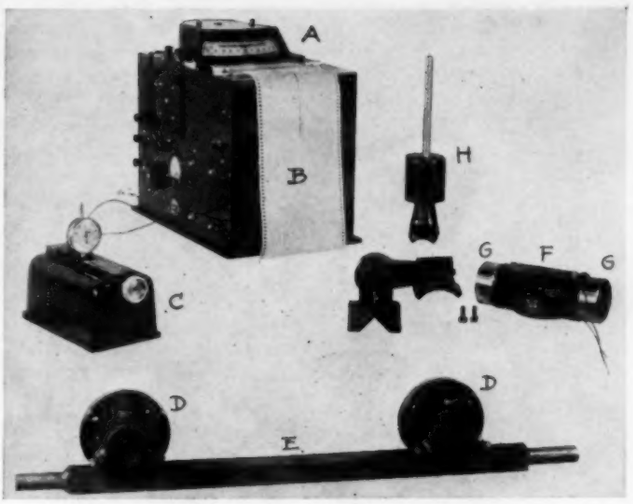
Let us pause a moment, however, to see just what factors we are concerned with. The usual and important factors controlling rubber manufacturing processes are:

Dimensional Measurements
Humidity
Plasticity
Pressure
Speed
Tack
Temperature
Time
Weights
Viscosity

These factors must be known and controlled in order to insure the production of uniform products. Some of these factors are more or less inter-related and have a bearing upon one another. We still depend upon the human element to a great extent in measuring some of these factors, but the speed and accuracy with which these factors must be measured is now so great with large scale production runs that a single error can cause hundreds of dollars loss either through the production of defective goods or by causing a tie-up in the process. It is accordingly very necessary that all controls be made automatic wherever possible. Let us analyze some of these factors and see how they are controlled.

Dimensional Measurements

Dimensions of lengths and widths are easily recorded and controlled by well-known measuring and counting devices. Control of thickness is somewhat more difficult. In many factories this factor is still controlled with a thickness gauge dependent upon the human element. Continuous operations, however, have required automatic and continuous recording of stock gauges. Very elaborate devices are necessary for control of gauges during continuous operation. The two outstanding methods for this purpose are the electromagnetic type as exemplified in the Schuster gauge, and the electrostatic or condenser type as developed by the Atlantic Precision Co. There are also mechanical devices built along the lines of the Randall-Stickney type of gauge, which give a continuous indication of gauge but make no record of the same. These elaborate gauging systems still do not eliminate the human element entirely, they really give a uniform indication of how the calender is operating, and make accurate record of same for the supervising department. The calender operator is obliged to watch these indicating devices and adjust his calender accordingly, the latter operation being very rapid and more or less automatic.



A Detailed View of the Component Parts of the Schuster Magnetic Gauge with Indicating Dial and Recording Device shown at A and B respectively. C shows Setting Device; D, Brackets for Mounting Sliding Guide Bar; E, Sliding Bar Guide; F, Electromagnet; G, Gauge Wheels or Rollers; H, Counterweight

The next necessary step is to make these calender adjustments automatic, thus eliminating the human element entirely. Nevertheless, our present devices are a great step in the right direction and make possible very accurate control of calendering operations with minimum labor.

Humidity

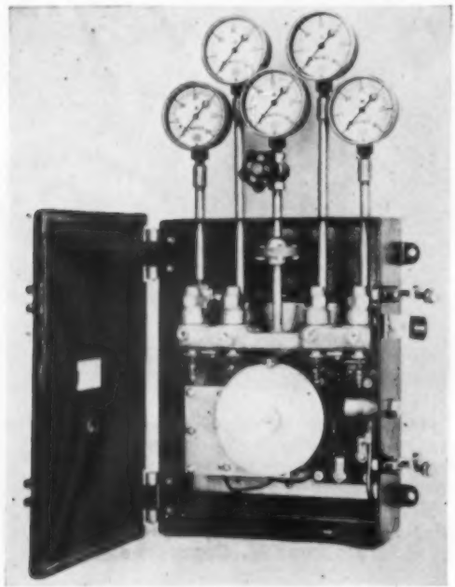
The control of humidity is necessary in certain departments for processing of cotton cords and fabrics; also in certain cements and dipping operations. Very satisfactory conditioning apparatus is now available for automatically controlling this factor.

Plasticity

Plasticity taken together with elasticity, are important properties which have been given a great deal of consideration within recent years. Until quite recently, very little attempt was made to directly measure these qualities. Nevertheless, mill and calender room operators, without recognizing the nature of these factors have made great use of them for regulating their mill and calender roll temperatures. This was done by digging their fingers into the stock to determine how soft or tacky it was and relying upon their own judgment as to when the rubber had reached a satisfactory state of plasticity for correct calendering condition. Unfortunately, their

View Shows a Group of Control Instruments on a Calender Turning out Cord Fabric. The Calenders are Fed Rubber Automatically by Belt Conveyors as Shown to the Right of the Operator Who Controls the Feed by Means of the Switchboard at his left. On the Post in the Center Is an Automatic Recorder Showing Temperature of Calender Rolls. In the Background at the Right of the Post Is the Automatic Weighing for Controlling the Weight per Sq. Yd. To the Right Is the Cabinet Containing Autographic Charts and Instruments for Maintaining Uniform Penetration and Deposit of the Rubber Around the Cords. (Photo courtesy Fisk Rubber Co.)

judgment varied from time to time and it was often necessary to readjust roll temperatures and speeds before a satisfactory product could be obtained. Such conditions could no longer be tolerated under present day methods especially where continuous runs are



Interior View Small Model Bristol Tube Cycle Mold Controller

required. Consequently, a definite method of determining these properties was necessary.

Unfortunately the method of determining plasticity and elasticity requires considerable time and the services of trained men. This does not lend itself to continuous production. We accordingly have done the next best thing, namely, to control other factors which in turn control plasticity. We have found that plasticity can be varied by time, speed, temperature and sequence of operation. These latter factors can be controlled more or less automatically, and so by adjusting these factors a definite degree of plasticity is obtained. Systematic checks on plasticity are then made at stated intervals to further insure that correct operating conditions are being maintained.

Pressure

Devices for controlling air, steam and water pressures have probably received the greatest attention and are more nearly automatic than many of our other control devices. The control of steam pressures is very important in the vulcanization of rubber and on account of this importance, was one of the first factors to receive the attention of engineers and instrument manufacturers.

Since temperature and steam pressures have a definite relation to each other, either can be used as the basis of control. In vulcanizing rubber, we are concerned chiefly with the control of temperature. Since in the majority of cases steam is the source of heat, the temperature can be recorded directly by thermometer or by a steam pressure indicator. It is common parlance to speak of a "cure" as heating the rubber for so-many minutes at (say) 50 pounds steam pressure. What we are really after, however, is a cure for a definite time at 298° F, which is the temperature of steam at 50 pounds pressure. Since temperature is the all important factor of cure, it is customary now-a-days to use temperature as the controlling factor rather than pressure. Steam pressure used to be used to a large extent for vulcanization control and still is used in some factories. It is not, however, as accurate as direct temperature control. This is due to the fact that all vulcanizers are liable to contain a certain amount of air and condensate. These, when mixed with the steam, give lower temperatures than dry uncontaminated steam, although the pressure gauge may indicate correct pressure and remain constant. Whenever the flow of steam becomes retarded, condensation sets in and the temperature drops. Just as long as the incoming steam is dry and an adequate flow is maintained, the pressure will indicate the temperature, but any stagnation in the flow of the steam will indicate a higher temperature than actually exists in the vulcanizer. This is why most vulcanizers are well vented in order that air may escape and a continuous flow of steam be maintained.

Speed

Speed of operations can be quite satisfactorily controlled automatically through the use of various electrical relay systems. Certain operations depend upon manual labor to control them, but the latter have been reduced to a minimum, since the development of satisfactory control apparatus. The speed of certain operations can also be satisfactorily recorded by means of mechanical counting and recording devices.

Tack

We have found no satisfactory method for the direct determination of tack but we find that this can be varied by proper compounding and the control of speed, time and temperatures during milling. Consequently, if the latter factors are maintained constant, we are able to control tack.

Temperature

Temperature recorders have reached a high state of perfection, but the same cannot be said of temperature control, at least, as applied to all types of apparatus. Automatic control of temperature has been developed to a highly satisfactory state for vulcanizers, but automatic temperature control of some of our most important operations is still in a sadly neglected condition and needs remedying.

For instance, in continuous direct calender runs, it is absolutely necessary that the temperatures of Banbury, feeding mills and calender rolls be maintained at correct and constant temperature. With our present day highly accelerated stocks, a few degrees of incorrect temperature is likely to tie up the entire operation. One can readily visualize the necessity of such control when running several thousand yards of fabric per hour, especially when this is only one link in a chain of operations, each one of which must function continuously and uniformly in order to keep the cycle active. If one link breaks down, the entire production schedule is demoralized.

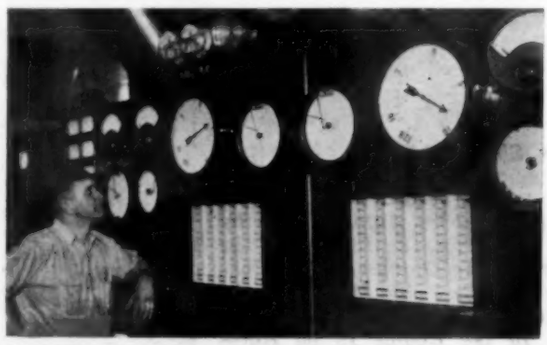
Temperature recorders are usually actuated by an expansible liquid or gas, or in the case of the pyrometer type by the electrical coupling of two dissimilar metals or alloys.

Time

Timing devices are already mostly automatic and have reached a high state of development.

Weight

The control of weight is still largely dependent upon the human element. Most factories depend upon the compound weigher in putting up batches, although direct reading scales are usually used. For continuous processes, automatic weighing devices have been developed such, for instance, as the weighing of cord fabric per square yard while in motion and the weighing of tread and raw



Electrically Operated Brown Boiler Water Level Gauges on High Pressure Boilers at U. S. Rubber Co. Plant at Detroit, Mich.

tube stocks as they pass over conveyor belts. This method of weighing, however, is still in the experimental stage and has not proven entirely satisfactory. There is a demand today for a satisfactory type of automatic recording scale for continuous production.

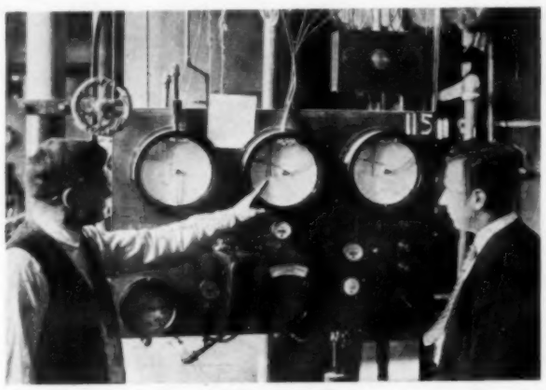
Viscosity

Viscosity is a factor necessary to be maintained in the produc-

tion of certain rubber solutions, cements and doughs. It does not lend itself readily to automatic control. We are in need of better control devices for maintaining uniformity of this factor.

Accessibility of Control Devices

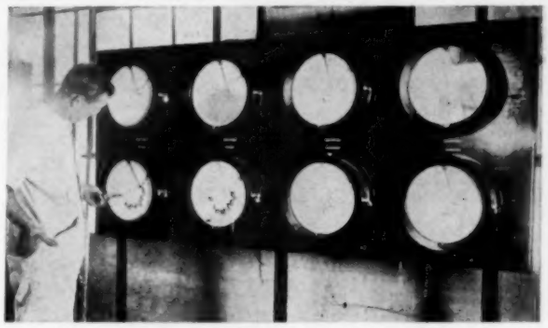
The location of controlling devices is an all important matter, which requires careful investigation for each individual installation. An expensive controlling device may be useless if not properly installed. So important is this matter that in many of the rubber factories no such installation can be made except under the supervision of the technical department. The location of control and indicating apparatus should be such that the insrtuments are convenient to read and adjust. They invariably contain cams, inking and other delicate attachments, which require constant attention. In the case of pressure and temperature recorders, it is necessary that they be so connected up that they give a true indication of vulcanizing conditions. Care must be taken to avoid dead pockets which might collect air or moisture. The piping of the entire apparatus must be satisfactorily worked out and the control bulbs



Foxboro Recording Thermometer, Recording Gauge and Indicating Thermometer. Center Below is a TAG Time, Temperature and Condensation Controller (Photo taken at Hood Rubber Plant)

located where they will give a true average indication of the temperature existing within the heater.

In the case of presses, the platens must be cored properly and so connected with the steam pipes that a continuous flow of steam is maintained. Dead corners, pockets and low spots in the circulatory system must be diligently avoided, otherwise the recorder



Brown Electric Flow Meter Panel Board at Goodyear plant in Sydney, Australia. This Installation Makes It Possible to Accurately Measure the Quantity of Steam, Air and Water Each Department is Using

will not indicate a true condition of temperature existing within the press.

In small vulcanizing units more uniform temperature conditions are usually maintained with series piping than with parallel piping. This is especially true when several steam circuits exhaust into one trap. The location and type of trap also has a great bearing upon the correct temperature control. Unless traps are properly located, are of sufficient size and are operated efficiently, it is impossible to maintain uniform vulcanizing conditions. Traps are usually either of the physical or thermostatic type, the latter type being more commonly used with the large steam vulcanizers, and are operated by automatic control devices through diaphrams and auxiliary air pressure.

It is beyond the scope of this talk to go into more detail as to the mechanism and installation of these devices, as these will no doubt be brought out more fully by the following papers. I have endeavored, however, to point out the necessity of more automatic control in our various manufacturing processes and will be interested to learn from our other speakers what are the newer developments in control equipment.

Modern Developments in Instruments for the Rubber Industry

By E. L. STILSON
The Bristol Co., Waterbury, Conn.

A COMPLETE description of recording and controlling instruments and their application to the many processes of the modern rubber factory would require a book of at least five hundred pages. No such book exists, and even if written it would be partly out of date by the time it came from the press. In common with other industries, rubber manufacturers now find efficient and economical operation a most vital need, and as a result instrument companies are constantly developing new recorders and controllers to meet new requirements. Much information is available in catalogs of various instrument manufacturers. It has been found necessary, however, for the instrument manufacturer to submit considerable data in the form of photographs, blue prints and multigraphed sheets while new catalogs were made up.

Assuming that technical and operating men are familiar with

Bristol Mill Roll Surface Temperature Recording Equipment

Editor's Note: The above paper was presented at the Chicago Group Meeting, Rubber Division, A. C. S., January 17, 1930.

most catalogued instruments, it will probably be of interest to discuss new developments.

As with others the rubber industry first used as a guide the indicating instrument. Later came the recorder, to be followed by the controller. In the last five years the growth of automatic control has proceeded at a tremendous rate.

This does not mean that either the indicator or recorder are obsolete. There are applications where they are sufficient, or where control is as yet so difficult or expensive that it is not justified.

The Recording Gauge

The earliest and simplest recorder, and that on which many others are based, is the pressure gauge. Recording pressure gauges that have been in use thirty years or more are not uncommon. The pressure gauge really consists of three parts, the case, the clock, and the pressure tube with its pen arms.

Recent changes in recording pressure gauges have been mostly in the form of refinements. The tendency in cases has been to make them moisture proof, and to eliminate iron and steel. Clocks are sturdier and are rust proofed, some being cadmium plated or chromium plated. Pressure springs instead of being aged by guesswork, are scientifically heat treated. One late development is to supply chromium plated pen arms. You all have probably seen old gauges with the pen arms badly corroded. This will not happen with modern instruments.

An early form of trouble with high range pressure gauges was caused by stretching of the pressure tube, due to repeated stresses. In modern gauges this should not occur. For severe service for instance, a tube has been developed that has stood up indefinitely, in test, under 60,000 reversals per week from 0 to 1600 lbs.

Special pressure tubes can be supplied for specific needs. For instance, for use on devulcanizers, where caustic is present, steel pressure elements are being supplied, and should always be specified.

The user can now secure recording gauges either of the round chart or strip chart type, which will accurately record total ranges as low as 1" water pressure, or as high as 20,000 lbs. to the square inch.

Recording Thermometers

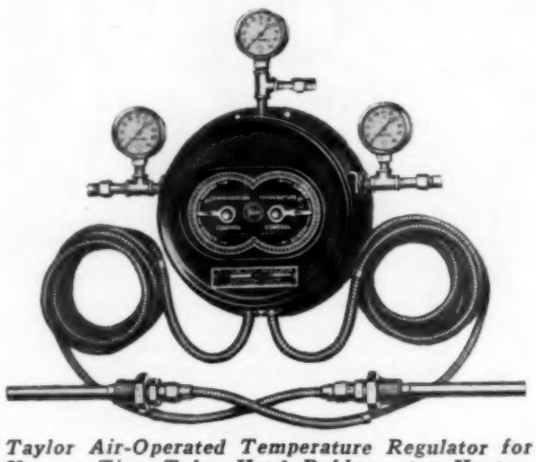
Recording thermometers are manufactured by several reputable companies, and are of three types, liquid filled, vapor pressure, and gas filled. As far as the case and clock are concerned, the recording thermometer has followed the same lines as the recording gauge. In fact, the recording thermometer is nothing but a pressure gauge, expressing in degrees the pressure generated in a closed system by the expansion of a liquid or a gas or the vapor pressure of a liquid.

The vapor pressure type of thermometer is commonly used for tire and tube heaters, devulcanizers, and other applications where ranges between 90° F and 500° F are to be recorded. It should not be used for temperatures below 90° F unless a special type of adjusted bulb is specified.

A great many rubber companies have found it possible to standardize specifications on thermometers for certain applications. One large tire manufacturer, for instance, has in use on vulcanizers over 700 recording thermometers of identical specifications, each with a range to 330° F and with a monel metal bulb having a total length of 3½", 2" of which is sensitive. Standardization of this kind means easy replacement in case of breakage. Standardization, of course, should always be worked out carefully.

Partial scale thermometer charts, covering only the working range, can be supplied by using a spring pointer which does not allow the pen to travel off the chart when the temperature falls below or goes above the chart limits, but does allow the pressure tube to rotate freely. Two, three, or four pen thermometers, or combined pressure and temperature recorders, can be supplied where comparative records on one chart are desired.

To meet special applications, bulbs or sockets exactly suited can be readily supplied. On devulcanizers, for instance, stainless steel bulbs have been used by at least two manufacturers. An aluminum socket also proves very satisfactory here.



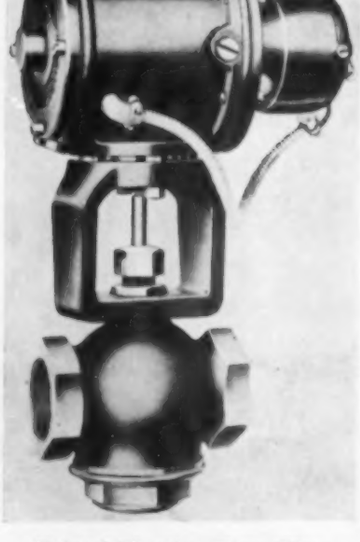
Taylor Air-Operated Temperature Regulator for Use on Tire, Tube, Hard Rubber, etc., Heaters

To meet severe conditions, as in the chemical plant, a number of types of protecting tubing are available. Where sulphur compounds are present, for instance, ambrac armor has been highly satisfactory.

In the selection of the type of bulbs to be used, consideration should be given to the bulb material. For sensitivity, either of recording or controlling instruments, a good rule is to select the bulb which is made of material having the highest heat conductivity, which will stand up under the chemical and physical conditions found. Copper bulbs are extremely sensitive, and are widely used for hot water temperatures, etc., but cannot be used, for instance, in high pressure superheated stem or when sulphur compounds are present.

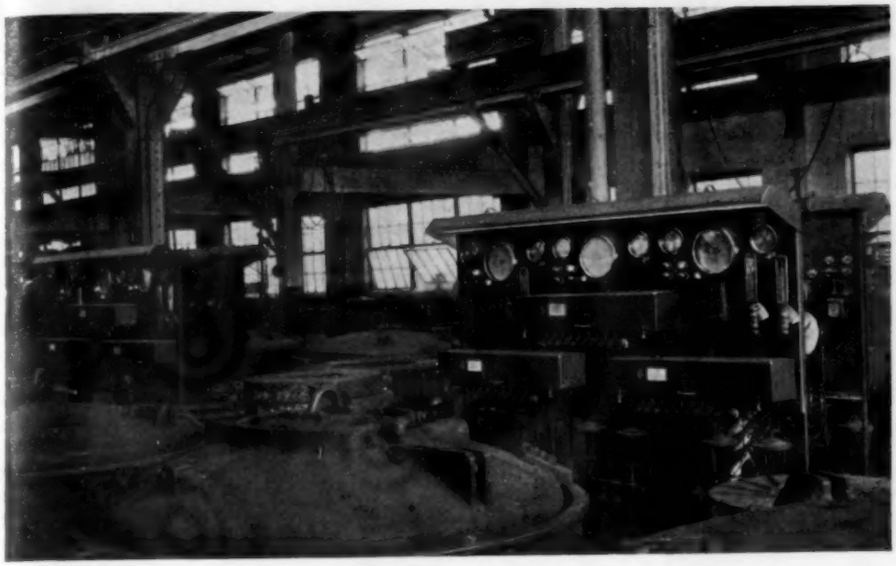
The question of bulb sensitivity is one that should always be considered. Take an installation of controller and recorder, having a sensitive bulb on the controller and a bulb in a heavy cast iron socket on the recorder. Such a combination will give a record showing almost perfect control even when the actual controlled temperature fluctuates widely.

The recording thermometer used on Banbury mixers have undergone changes in the last few years. The application is a severe one, and the original troubles were due to socket breakage, the bulb of course also breaking and necessitating repair. The original sockets were threaded. The modern sockets, for use with adapters, are not threaded, and are made of a very high quality tungsten steel. Socket breakage on the modern Banbury mixer recorder is extremely rare. Recently a number of strip chart thermometers with



Bristol Floating Type Electric Motor Valves

Cambridge Hand Model Surface Pyrometer Used on Moving Rolls



This Photograph Shows Six of the 20 TAG Cycle Controllers Used in a Large Akron Plant to Reduce Costs "by Making Everything Automatic." They not only Regulate the Temperature-Time Schedule of the Cure but also Test for Bag Leakage, Provide Bag Relief When the Hydraulic Pressure Drops, Control the Cooling Operations and, in Fact, Handle the Entire Cure from the Time the Hydraulic Pressure is Turned On

electric clocks, have been used by some of the large tire manufacturers, and prove very satisfactory.

In discussing the Banbury mixer, mention might also be made of the new timer, recently placed on the market, for use with Banbury's. This has a pointer, driven by a synchronous motor clock, traveling around a chart 18¾" in diameter. The chart can be marked for the operator's guidance, and a series of lights used to notify him at the end of each step of the mix. The timing of these lights is adjustable.

Another recent recorder is the mill roll recorder for taking the temperature of the stock itself. This instrument consists of a recording thermometer, with the bulb located in a plow, which is rigidly attached to the back of the mill. The plow point is tangent to the front roll, so that as the roll revolves the rubber in front of the plow tip pushes up over it continuously. The thermometer bulb is located inside the plow tip, and after the mill has started and warmed up a very representative record of the temperature is secured. The important point about the installation of this instrument is to see that the plow can not lift up and ride on top of the rubber.

Recording thermometers on calenders are quite universal. Various types of shoes are available. A two-pen recorder, with a special chart that can be easily read at widely different points, has recently been adopted as standard by one of the largest companies on all of their calenders. It is understood, of course, that temperatures taken by means of shoes are not exact roll surface temperatures, due to frictional heat, radiation from the shoe, etc., but recent tests indicate that well designed shoes give temperature records which are not so far off as has sometimes been thought.

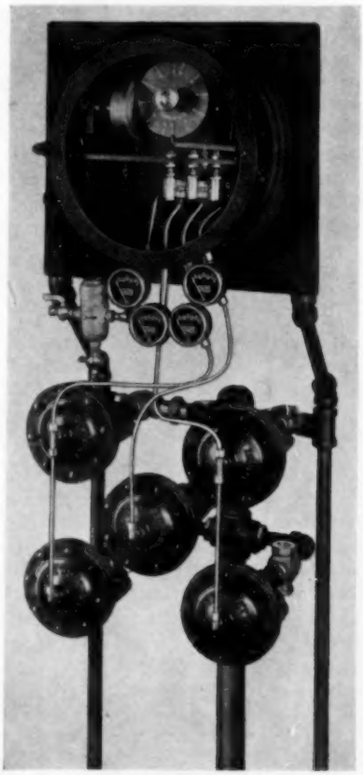
While discussing roll surface temperatures, mention might be made of a recently improved pyrometer which has met with great success and is now widely used. Pyrometers for taking roll surface temperatures have been used for some time, but having suffered from the fault of being too delicate, with consequent high maintenance costs, or else using forms of thermo-couples which gave varying readings with varying pressures.

The pyrometer recently introduced has a very sturdy movement. Automatic cold and compensation is of course used. The fixture used for taking the temperature consists of a thin flat thermo-couple, the two elements being but welded at the center. This couple is fastened to a spring bow by two pins. The bow is mounted on a fixture having a wooden handle at the other end, for the operator, and two adjustable joints, so the couple can be set at any angle. The connecting leads run from the handle to the instrument, which can either be held by the operator or set down at a convenient place.

As the spring bow bends to allow the couple to follow the contour of the roll, when pressure is applied, high readings due to frictional heat are not encountered. A range either of 0-350° F or 0-400° F has been commonly used for the rubber industry.

The tendency in all industries is to make as many processes as possible automatic. The automatic operation of a process not only usually reduces the labor cost, but results in a better product and fewer rejections. Every instrument manufacturer is confronted every day by new problems in automatic control. Sometimes these are very easy, sometimes hard, sometimes they look impossible. Napoleon once said, "If it is *hard*, it *will* be done. If it is *impossible*, it *must* be done."

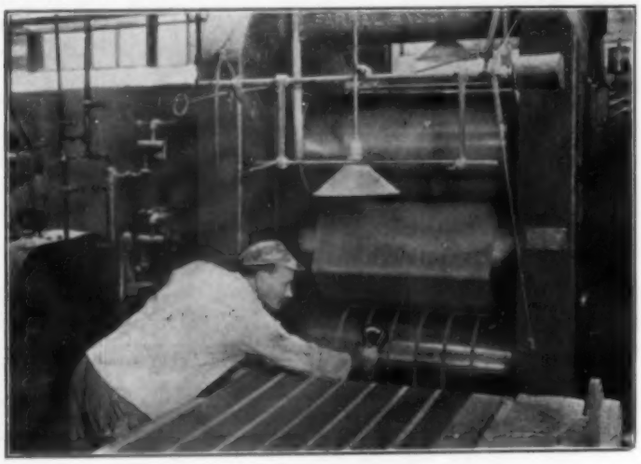
Automatic control in the rubber industry usually resolves itself into control of one or more of three factors, temperature, pressure or time. The simple air operated temperature or pressure controller, which acts as a throttle on the compressed air line to a diaphragm valve, which in turn controls the heating or cooling medium, is of course a very familiar instrument, as it is probably used more extensively in the rubber industry than anywhere else. The natural evolution of this instrument led to the development of the time temperature control, where the temperature control point is automatically adjusted so that the controlled temperature follows a predetermined curve. This instrument is also very simple. Now we come to



TAG Cycle Controller for Tube Mold with Two Valves for Closing Cylinder, Two Valves for Locking Cylinder and Middle Valve for Tube. Illustration Shows Valves in Compact Arrangement Below Controller with Air Supplied by Vertical 1½" line in Center

the cycle controller, which in its latest development is more than human.

At least three companies have done extensive work on cycle controllers. The cycle controller may be generally defined as an instrument which controls all the variables in a complete cycle of operation, from the time the operator pushes the switch or lever until the process is completed. In many industries, such as steel, there has been no demand for such an instrument, as processes are



Using Cambridge Surface Pyrometer to Check Temperature of Calender Roll

largely continuous, however, continuous processes are not much used in the production of such items as tires or tubes.

Cycle controllers have been mostly developed, so far, either for large vulcanizers, or for individual molds, which are now coming into use in many plants both for tubes and tires.

The cycle controller on the large pot type tire vulcanizer must automatically handle many operations. On one characteristic cycle, for instance, it must perform the following operations:

1. Admit air to the air bags as soon as the hydraulic pressure, which is hand controlled, reaches a certain value.
2. Close valve to air bags and test for leaks. In case of leak of a certain amount, cycle stops and signal notifies operator.
3. If no important leak exists, steam is turned on and temperature brought up and held for the correct time, over the required curve.
4. At end of cure steam is turned off and cooling water turned on, simultaneously opening drain valve from the bags.
5. After cooling for a set time water is turned off, and air is released.
6. In case of hydraulic failure during cure air is released and steam shut off.

Cycle controllers of this type control pressure, temperature and timing operations by cams. These cams should be adjustable so the cycle can be varied to suit conditions.

The cycle controller for the individual mold is a much simpler mechanism. Consider first the tube mold. Tube molds are usually arranged in line, and supplied with steam from a header. Temperature control being accomplished over the entire line. Hence the cycle controller is a timing controller only.

New models of tube mold cycle controllers are compact, simple, and fool proof, and take up no more space than a recording gauge. Two types have been built (1) a controller in which all operations are controlled by a single cam. (2) a controller using individual cams for separate operations.

A characteristic cycle for a tube mold controller is as follows:

(1) Operator, having placed tube in mold and made valve stem connections releases safety lever. This release also shoots air into a small pneumatic cylinder, which trips a mercury switch and starts the motor clock.
(2) Lid is closed automatically.
(3) Mold is locked.
(4) Diaphragm is inflated.
(5) Tube is inflated.
(6) Cure goes to completion, at which time tube is deflated, diaphragm deflated, mold unlocked, and mold opens, at which point time stops.

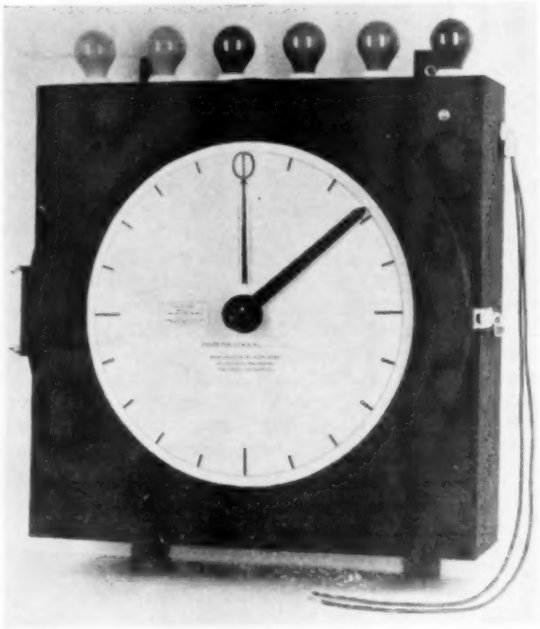
All these operations can be handled by a single cam, driven by a Warren motor clock, which successively opens or closes a series of pilot air valves through a tripper mechanism. The cam is a circle except for the steps which represent the descent of the valve tripper at the end of the cure, and the steep slope which represents the rise of the valve tripper at the start of the cure. The pilot air valves in the controller, which in turn control three way diaphragm valves in the supply lines to the mold, are so set as to be operated in successive steps.

Tube molds vary somewhat in construction, but any now in extensive use can be operated by the small cycle controller described above, with, in some cases, a few slight additions to the mold itself.

Tire molds can also be operated by the cycle controller, except that it is necessary to incorporate in the layout a positive safety so that the mold can not be opened while the pressure inside the tire exceeds a very small value.

The development of the small cycle controller, of this type, means that it is not only available for tire and tube molds, but for a great many other processes, both in the rubber and other industries, where the control of time cycles is desired. When it is considered that these instruments are very reasonable in cost, and will not only give a uniform product but result in great savings in labor cost, it will be seen that their extensive use is justified.

When one speaks of automatic control in the rubber factory, the first thought is of air operated controllers. Recent developments indicate that there will soon be available for many processes a new type of control which will give full floating operation electrically. There has been developed and placed in successful commercial operation a type of motor valve which is full floating, and which can be used on steam, water, or gas. While this type of control has not yet been widely used in the rubber industry, it has been carefully worked out and found to give, on certain other steam processes, an extreme closeness of control which could not be duplicated by any air operated controllers tested.



Farrel-Birmingham Process Signal Indicator (Mnfd. by The Bristol Co.)

The usual electric motor valve has been two position, or open and shut, or in a few cases, three position. The new floating valve has an infinite number of positions, and when used with a sensitive thermostat controller, assumes the correct opening to supply exactly the needed amount of steam or other heating medium. It has also been successfully worked out with a pyrometer controller for use on gas. On a gas fired dryer, for instance, it not only floats on the gas line, but the layout can be so made that the controller will anticipate sudden changes and move to correct them before they fully develop. Considering the extensive use of completely automatic electric control in other lines, it seems reasonable to assume that it will be of more and more interest to the rubber industry as time goes on.

The Growing Rubber Industry of JAPAN

Rapid Strides Made in the Manufacture of All Classes of Rubber Goods—Export Business Expanding Throughout Entire Far East Challenges United States Competition

Where Japan Makes Its Rubber Goods. The Figures Indicate the Number of Manufacturing Establishments Located in Each City

IN NO phase of Japan's industrial life has progress been so rapid as in the case of the rubber industry, according to a recent report from the United States Department of Commerce. Ten years ago, Japan depended almost entirely on imported rubber products. Today the domestic industry manufactures automobile and motorcycle tires, inner tubes, hose, belting, flooring, all kinds of toys, gloves, footwear, and many other products. Besides, Japan maintains an export trade in rubber goods valued at more than $8,000,000 and ranks as the eighth most potential rubber-exporting country.

In 1928 the trade in rubber goods was favorable to the extent of $2,831,300, and in 1929, $4,884,700. Exports, consequently, advanced at the rate of 35 per cent, while imports increased by only a little more than 1 per cent.

According to the latest production figures of 1927, the total output of rubber goods was valued at $31,317,300—an increase of 13 per cent over 1926. Production of rubber tires in that year accounted for 30 per cent of the total, or a value of $9,422,500. Footwear was not so far behind tires, when 17,171,984 pairs were produced valued at $8,606,300. Miscellaneous rubber products made up the remainder, or a value of $13,288,500.

Local Industry Started Around 1886

The Japanese rubber industry had its beginning perhaps in 1886 when the Mitatsuchi Rubber Manufacturing Company, Ltd., was established at Tokyo. It concerned itself principally with the production of mechanical rubber goods, which it has since continued, and for a number of years has been a frequent contractor for Government supplies. In recent years the company has expanded its activities, until now it produces boots, shoes, all kinds of hard rubber goods, tires and accessories of various kinds, balls, toys, gloves, and the like.

The Dunlop Rubber Company, (Far East), Ltd., a subsidiary of the British organization, stands perhaps today at the head of the industry. In 1908, Dunlop established a branch at Kobe to cater to the tire requirements of the whole of the Far East. At that time the demand was limited almost entirely to ricksha and a few bicycle tires. The market expanded so rapidly that in spite of the many additions to the plant, the quarters have never been ample.

The company has now in course of construction at Wakinohama, Kobe, a new 4-story building. This building will be of structural steel frame and reinforced concrete throughout and will have a total floor space of 360,000 square feet, thus being one of the largest single block buildings in Japan. New machinery of the very latest type is being included.

While the company's name is directly linked with the word "tires," the following articles are also manufactured: Matting, transmission and conveyor belting, tennis and golf balls, thread, hose of all descriptions, sheeting, water bottles, gloves, surgical tubings, and football bladders.

The Japan Rubber Footwear Manufacturing Company, Ltd., is one of the important contributing factors in placing Japan as a leading manufacturer and exporter of rubber footwear. The headquarters of the concern is located at Kurume, but an important branch factory is situated at Fukuoka. The company employs about 7,500 workers and has an annual output valued at 50,000,000 yen. It specializes in tabi shoes, crepe and rubber-soled canvas shoes, so-called Chinese shoes, and children's 1-strap shoes.

The Akiyama Rubber Works, of Osaka, was another pioneer in rubber manufacture, but for a number of years has manufactured rubber shoes, primarily for domestic consumption. Last November, after the completion of its enlarged factory, the company began the exportation of rubber footwear, with apparent success.

Pioneers in Footwear Production

At Osaka is located the Matsushita Rubber Works, which is perhaps better known for its erasers, which are exported through the Orient. It was also a pioneer in the manufacture of rubber footwear in Japan, and in addition to its large output of erasers it continues to produce and export large quantities of rubber footwear.

Other important makers and exporters of rubber footwear in Japan are Kuwahara & Company, Ltd., Marn A. Rubber Manufacturing Works, Tamura Kogyo & Company, Ltd., and Ikuno Rubber Works, all four of Osaka. The latter employs more than 650 men and women, and with the aid of modern factory equipment produces more than 12,000 pairs of shoes daily.

The Settsu Rubber Company, Ltd., dates back to 1912, but only since 1918 has the company expanded into an important factor in the domestic production. In 1921, the production of motorcycle tires and tubes was begun. The

Value of Japanese Trade in Rubber Products

Item	Imports 1928 (Yen)[1]	Imports 1929	Exports 1928 (Yen)[1]	Exports 1929
Rubber tires	4,671,092	4,955,363	5,724,861	6,300,669
Rubber footwear	(2)	(2)	3,883,648	7,444,957
Rubber toys	(2)	(2)	1,934,418	2,161,288
Semi-manufactured	256,688	280,336	(2)	(2)
Waste rubber	221,463	324,113	(2)	(2)
Soft rubber goods	1,390,751	1,116,819	(2)	(2)
Rubber goods, n. e. s.	89,517	83,836	1,187,307	1,449,464
Total	6,629,511	6,760,467	12,730,234	17,356,378

[1]The yen, at average rate of exchange, equalled $0.464 in 1928 and $0.461 in 1929.

[2]If any, included in rubber goods, n. e. s.

company also produces printing rubber rollers and other industrial rubber products.

The Miki Kosaku Rubber Works, of Osaka, is mostly concerned with the production and exportation of stationery rubber goods. Its monthly production is reported to be 150,000 pounds.

Another important concern is Tokyo Rubber Industrial Company, Ltd., of Tokyo, incorporated in 1919, with a branch at Osaka. All kinds of tires and inner tubes, mechanical rubber goods, hard rubber goods, and miscellaneous rubber goods are produced. The company is a frequent contractor for government work.

The Meiji Rubber Company of Tokyo, was established in 1900, producing mostly mechanical rubber goods. The production of automobile tires was begun in 1914, when up-to-date machinery was brought from Great Britain. This company contracts for the Government and all large industrial companies.

International Competition in Footwear

Recently Japan has become a potential factor in the international trade of rubber footwear and is now offering serious competition to the long-established trade of the United States and Canada, which have long maintained the upper hand.

During 1929, Japan exported 6,954,000 pairs of rubber footwear, against 13,095,000 pairs by the United States and 11,610,000 pairs by Canada. But from the available statistics so far for 1930, it looks as if Japan is far outstripping both the United States and Canada.

Modernly equipped factories, mass production, nearer the source of the crude rubber supply, and cheaper labor are some of the factors which enable the Japanese manufacturers to export to near-by markets, and thus undersell European and American manufacturers. But the Japanese manufacturers are not confining their activities entirely to the Orient and the South Sea Islands. Footwear is going to Africa and South America.

Rubber boots and shoes occupied the leading position in the exports of rubber goods during 1929, supplanting tires. Exports of footwear advanced from a value of $1,802,400 in 1928 to $3,432,100 in 1929—an increase of 90 per cent. The trade by countries is not available, but recent reports from the far eastern markets state that Japan is exporting large quantities of rubber footwear at such low prices that the old-established European and American products are unable to compete.

Imports of rubber footwear into Japan are negligible. A relatively high import duty practically makes Japan a closed market in this category.

Tire Production Steadily Increasing

Production of rubber tires in Japan is keeping pace with the increased use of the motor vehicle and the progress which Japan is making in the export field. The exports of rubber tires were valued at approximately $2,656,900 in 1928, increasing to $2,904,600 in 1929. The estimated exports of automobile casings by volume were 207,000 in 1928 and 227,000 in 1929.

The consumption of tires in Japan is much higher than in the United States. Practically all roads are of coarse gravel, are very narrow, and have numerous sharp turns and steep grades, all of which tend to reduce the life of a tire. A further factor tending to cause excessive use of tires is the fact that about 90 per cent of the passenger cars is being operated for 24 hours per day. According to reliable estimates, a pleasure car uses about 3 tires per year, taxi 6, trucks 5, and bus 5.5.

The local Dunlop plant furnishes about 40 per cent of the replacement sales, which for 1929 were reputed to be in excess of 375,000, while the sales for 1930 are estimated at 479,000.

Original Tire Equipment Field

Several automobile manufacturers maintain local assembly plants in Japan, but the local Dunlop plant has a practical monopoly of the original equipment business, since it is in a position to quote prices which the representatives of foreign-made tires are unable to meet. The number of original equipment sales in 1928 was around 83,300. Although the figures for 1929 are unavailable, they are believed to exceed those of the previous year.

In spite of the fact that the local production and exportation of automobile tires are increasing, imports from foreign sources are also advancing—from a value of $2,167,854 in 1928 to $2,284,422 in 1929. Although the imports by countries of origin are not available, it is known that the United States is an important supplier.

Rubber Toy Production Grows

The domestic production of rubber balloons, balls, and toys is highly developed and is increasing annually. Again, Japan is able to export at prices in this class of goods much below other countries. In fact, Japan is now a serious competitor in rubber toys, exporting a value of $897,763 in 1928 and $996,354 in 1929. In this class Japan is not only competing with other foreign countries in the Far East but the nation is extending its activities to Europe and South America.

ALBATAR

WITH the consumer demand for automobile tires with white side walls increasing, the manufacturers have been beset with new problems. The side walls must not only form a perfect joint with the black tread but must adhere firmly to the carcass, and at the same time be free from discoloration caused by the use of ingredients usually employed to obtain these effects. The addition of mere softeners for this purpose will not suffice. Softness of stock is not the same as adhesiveness and furthermore the side wall should consist of a firm tough compound. The use of most softeners which may be employed in white rubber compounds is usually accompanied by a sacrifice in tensile strength and abrasive resistance.

A new softener to meet manufacturers' requirements in these respects has been introduced by E. W. Colledge, under the trade name of ALBATAR. Like PIGMENTAR, another softener marketed by E. W. Colledge, it promotes tackiness without sacrificing tensile properties. It also appears to flatten the time-tensile curve without severe sacrifice of elongation. ALBATAR is not the equivalent of PIGMENTAR, where color is not a consideration, PIGMENTAR will be found to give better results. However, PIGMENTAR can not be safely employed where white is the fundamental color. In this case, ALBATAR has the advantage that it can be used in white stocks.

Mechanical Materials Handling Systems for Rubber Factories

Proves Greatest Factor in Reducing Unit Production Costs — Modern Devices Available for Practically All Plant Operations Involving the Handling of Materials or Products in Process

By M. G. Rosenthal

Cleveland Electric Tramrail, Wickliffe, Ohio

LEADERS in the rubber industry are leaders because they are never content with what they have if there is any chance to improve the product or reduce its manufacturing cost.

Research has led the way to better quality and quantity and does not end at the shipping room door. It's success depends upon the satisfaction to the ultimate consumer. Through research it has been made possible to take cheaper raw material and produce a better finished product today than what was possible to produce with the finest of raw materials and methods of manufacturing in the pioneer days of the industry.

The old time reputable concerns in the tire industry manufacture tire mileage according to public demand. It is a well known fact that tires can be produced to last fifty or sixty thousand miles or more but the present demand for them does not justify a large production. In 1900 the old cushion tire would not produce the mileage of our present standard quality balloon tire.

In 1906 the writer had a set of high grade tires on an apposed engine type of Buick car guaranteeed for 3,000 miles that actually lasted for an average of 4,200 miles before they were blown completely to pieces. As tires changed from the high pressure fabric to cord and then to low pressure balloons, there were a great many superstitious people that doubted the side wall strength of the balloon tire. Research again produced a tire with more mileage and riding comfort according to trade demands, with the superstitious ones of several years back as the satisfied users.

All this extra value in tires has been accomplished with a large reduction in consumers' prices. Improved manufacturing through large expenditures for modern equipment as well as advanced methods are the outstanding reasons for these lower prices at a profit to the manufacturer.

Those that do not follow research methods in most cases are nearly ready to throw up the sponge in token of defeat. Research means not only the investigation of raw materials, their compounding and treatment but the mechanical handling throughout rather than the manual. Cheap manual labor put over 150 automobile manufacturers on the rocks in the past 20 years and will do likewise in the same proportion to other industries employing manual labor instead of using modern equipment that will produce the same operation in a fraction of the time.

Mechanical materials handling has been one of the greatest factors in reducing costs in the rubber industry. The factors that contribute to its success are not only to lift and carry the articles from one operation to another but due to the fact that in most cases it is a "pacemaker" for production. By materials handling it has been possible to increase the unit size of fabric rolls which will be explained later. More small articles are conveyed in one unit load also. Overhead materials handling synchronizers operations on batch lots of varied sizes and qualities of product in course of manufacturing and also saves waste and damage through the predetermined path of travel.

Not many years ago the leaders in the tire industry could see many advantages by increasing the size of the fabric rolls and through the evolution of time the weights of the rolls increased from 600 pounds to 1,000 pounds and gradually up to approximately 1,800 pounds which is very common today. The increasing of the size of the claims were that the rolls must be carried in a vertical position and in others that they must be carried horizontal. All this difference was due to the consistency of the friction fabric and the manner in which the rolls were carried by the overhead system. Under latest developments it is more common practice to carry the rolls horizontal as this is the position they are used at the various machine operations.

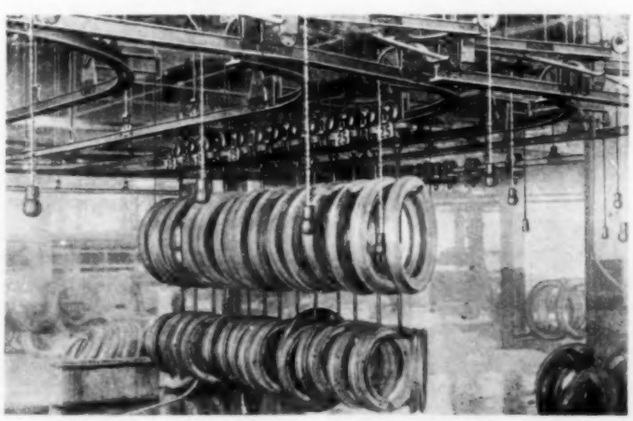


Figure 1
Side Spur Tracks Used for Complete Heater Lots

The increased roll size made a longer machine run possible with less waste at the bias cutters. The larger rolls are handled one, two or three at a time by one operator on overhead materials handling equipment whereas the smaller

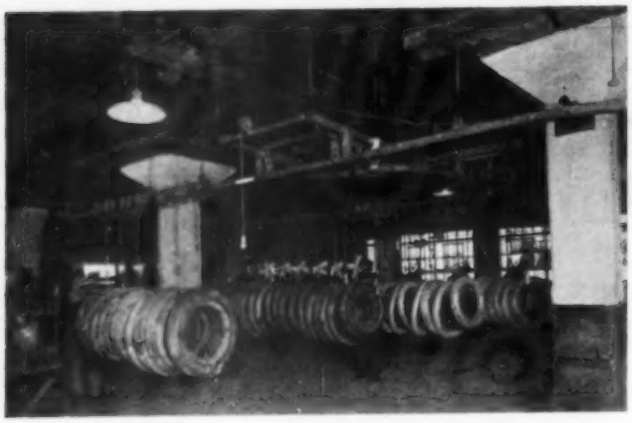


Figure 2
Entire Heater Lot Moved as a Unit Into the Storage Line by One Man

rolls were handled singly by one or two men on a floor truck.

The most modern method for handling friction rolls is on an overhead tramrail switch system. Starting at the calendar machine, each roll is hoisted with a canvas sling grab through the roll core then transferred to an individual carrier which has four wheels, a load bar, a swivel eyebolt from which is fastened a short chain and load hook. The rolls are then conveyed to the storage lines and remain suspended until ready for the bias cutters where they are again lowered. The same grab used for the friction roll returns the liners for inspection and washing.

A modern track and switch layout provides for selecting the rolls in the rotation in which they entered the storage department. Under this method the oldest rolls are used first with less difficulty at the bias cutters.

The medium and smaller tire plants have solved the problem of handling green tires from make-up department to heaters and from heaters to de-bagging by the use of overhead tramrail. There are many advantages in a system of this kind as a whole heater lot is assembled into a single unit and moved to the heater at one time. Side spur tracks are used which contain carriers enough for a complete heater lot. Inspected air bags are placed on two top hooks on the carrier grab (see Figure No. 1) in the rotation of the moulds at the heater and conveyed to the tire make-up department ready for the green flat tires to be spread and the bag placed into the tire and then placed on the two lower hooks of the grab. When the heater lot is made up it is moved by one man as a single unit into a storage line just large enough for the heater lot and remains there for the allotted time to be taken to the heater. (See Figure No. 2).

The consecutive order of the moulds is maintained in making up the heater lots throughout by conveying in unit lots at all times. The same rotation occurs on the reverse operation from the heaters to de-bagging and again back to the green tire make-up.

In tire plants where practically every heater lot is a mixed lot, the synchronizing of operations is well taken care of by the above system by having a heater lot ready on the spur track in advance. Electrified carriers conveying various unit lots of rolls and tires from one operation to another as well as automatic dispatching of unit lots is already being considered by a great many in their research work.

We have reached the stage in manufacturing where manual labor can no longer compete against modern materials handling.

U. S. Trade in Bathing Caps

DURING 1929 the United States reached its peak year in its rubber bathing cap foreign trade, when exports were valued at $392,760—an increase of 5 per cent as compared with 1928, according to reports from the Department of Commerce. Volume was maintained at a high figure, but the most significant fact was that, in spite of the low market price of crude rubber, the average export value per dozen held up remarkably well. This indicates that the higher-priced article of American manufacturers is selling for its quality—a fact which naturally appeals to the discriminating consumer.

Parallel with the increased commerce in bathing caps goes the trade in bathing slippers. But inasmuch as they are allocated in the official United States statistics with overshoes and galoshes, the trend can not be definitely given. From reports of the United States foreign officers, however, it is known that American-made bathing slippers are gaining favor and are seen in increasing quantities in the shops and at the beaches in almost all foreign countries, where bathing plays a part of summer recreation.

Although the United States is the leading exporter of bathing caps—sending its products to more than 70 foreign countries—Germany, Great Britain, France, Austria, Belgium, and Japan are formidable competitors. Perhaps the most severe opposition in recent years has been from Germany, which is manufacturing and exporting a product below the price of the American manufacturer. For this reason, German-made caps appeal to the consumer with a limited pocketbook.

The American-made product, however, is in demand for its lasting qualities and for its originality and versatility. Consequently, it is not surprising that Great Britain, France, Canada, Argentina, and Australia, all of which have a high per capita wealth, should prove our best customers.

United States Exports of Bathing Caps to Principal Countries

Country of Destination	1927 Dozen	1927 Value	1928 Dozen	1928 Value	1929 Dozen	1929 Value
United Kingdom	37,475	$ 96,024	31,006	$ 92,436	46,688	$130,087
France	7,873	14,641	10,811	23,250	17,372	34,967
Canada	24,006	28,549	25,114	30,960	27,698	33,828
Argentina	8,258	21,574	5,079	13,246	13,033	23,488
Australia	10,453	32,130	11,640	36,131	6,935	18,200
Austria	466	1,182	2,847	7,924	6,326	14,898
Japan	10,509	20,656	10,586	23,232	9,194	14,606
Denmark	16,071	33,044	13,388	28,453	6,886	14,126
Other countries	42,565	92,059	51,768	118,983	49,403	108,560
Total	157,676	$339,859	162,239	$374,615	183,535	$392,760

The United Kingdom is our best market for bathing caps, taking 25 per cent of the total volume and 33 per cent of the value in 1929.

The trade so far for 1930 is most promising. While many rubber specialties decreased during the first four months of this year, as compared with the corresponding trade of 1929, rubber bathing caps showed an increase. Exports for the January-April period of 1929 totaled in round figures 89,000 dozens, while the 1930 total for the corresponding period was 92,000, an advance of 4 per cent.

U. S. Sleeves for U. S. Navy

Rubber sleeves for propeller shafts have been adopted as standard practice by the United States Navy. The United States Rubber Company has bid successfully for supplying these rubber sleeves on a large majority of the new ships constructed for the Navy.

Of the eight 10,000-ton cruisers with eight-inch guns recently constructed, the following five have rubber propeller sleeves furnished by this company: Salt Lake City, Chester, Northampton, Houston and Augusta.

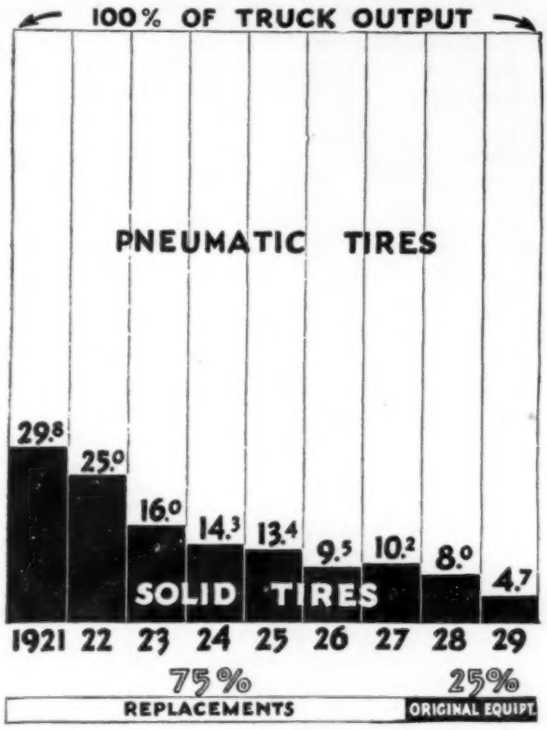
The Fast Disappearing Solid Tire

THE steady decline in the use of solid tires on motor trucks is attributed more to economic causes than to the tendency to legislate against their use, according to a survey made by the National Automobile Chamber of Commerce. Increased speed and lower maintenance costs are the chief factors favoring the pneumatic tires.

Present use of solid tires is practically confined to specialized fields where pneumatic tires are unable to withstand strain and wear under heavy loads.

Further evidence of the growing disfavor of solid-tired trucks is the fact that nearly 75 per cent of the 570,372 solid tires produced in 1929 were used for replacement purposes while only 142,592 cushion tires were used to equip new trucks and trailers.

Statistics compiled by the Chamber of Commerce reveal that solid tires were standard equipment on only 4.7 per cent



of the 805,000 trucks manufactured in the United States in 1929. The significance of this trend is indicated by the fact that in 1921 more than 29 per cent of the trucks manufactured were equipped with the solid, or cushion-type, tire.

The accompanying chart, as reprinted from *The Industrial Digest*, shows very graphically the trend away from solid tires.

A Western Pioneer in the Rubber Manufacturing Industry

CHARLES C. GATES, president of the Gates Rubber Company, Denver, Colo., was graduated as a mining engineer from the Michigan College of Mines in 1903. Through the direction of important mining operations in many parts of the West, he became widely known in this particular profession and as a consultant engineer at Denver.

In 1910, his marriage to Hazel Rhoads of Denver, Colo., turned him from mining and engineering to a career more compatible with home-making, and in 1912, he purchased an almost extinct small leather manufacturing business, occupying a 25x40 foot shop room in Denver, and began producing steel-studded leather treads for protecting half **worn tires. From the scrap leather left over** from cutting the leather treads, Mr. Gates hit upon the idea of making halters, and within two years was making more halters than any other manufacturer.

Charles C. Gates

Guided over exacting courses by the engineering mind of Mr. Gates, the Gates Rubber Company has expanded until today the factory occupies 22 buildings, manufacturing 307 products—tires, tubes, accessories, transmission power belting, and mechanicals, including all types of hose and hard rubber goods. These products are marketed in every state of the U. S. and 90 foreign countries.

Through all the ups and downs of the rubber industry during the past 15 years, the Gates Rubber Company, through the continual guidance and resourcefulness of Mr. Gates, has never had a year without a net profit—something of a record and a real achievement within the rubber industry.

And They Talk About Farm Relief

RUBBER GROWER
"CARRAMBA! MADRE DIABLE! IZE REGUSTED!"
TO MARKET
CRUDE RUBBER PRICES NOW 13¢ LOWEST IN HISTORY
"LOOK AT THAT! HARD LUCK GUY, I'LL NEVER HOLLER AGAIN OVER $1.50 OR $2.00 WHEAT!"
AMERICAN FARMER
WEB. BROWN

EDITOR'S NOTE: *In the above cartoon, printed from the Akron Beacon Journal, the artist depicts the crude rubber grower in the guise of a Mexican peon and the rubber in the form of balls. By way of mild criticism it might be suggested that Web Brown look up the Malayan native type and show his rubber crated in boxes. However, "artistic license" in this case does not detract from the serious story back of the artist's conception*

EDITORIAL COMMENT

Unwarranted Tire Price Cuts

A MORE glaring example of the total lack of cooperation and the "unfortunate" (to use a mild term for vicious) cut-throat competition, which pervades throughout the domestic tire industry, could not be found than in the recent action of the leading manufacturing companies in reducing tire prices at this particular time. No sound excuse can be found for such action. An insatiable appetite for sales at any price is the only apparent cause.

This is not the time to sacrifice profits to drive competitors to the wall. Tires today can readily sell themselves on their merits and good performance should bring a good price. Competition on quality and degree of performance is one thing and makes for good healthy business but cut-throat competition on the basis of any price to get the trade away from the other fellow is unhealthy. Some day ethics will force a better policy. It is too bad that ethics has been such an unfamiliar word to the rubber tire industry thus far. We heard much about "ethics" and "co-operation in competition" when the deceased Rubber Institute was alive, but "Alas, poor Yorick." The industry is still blind to the evils in its merchandising policies and continues to go after business "like wolves in the jungle," to quote F. A. Seiberling, in his speech before the Rubber Manufacturers Association last winter. No leadership seems able to assert itself to bring constructive policies to the industry.

W. O. Rutherford, president of the Pennsylvania Rubber Company, in a scathing denunciation of the recent tire price cut, makes the following commendable points:

1—Tire prices are now the lowest in the history of the industry with the mileage performance considerably greater than ever before.

2—There is no public demand for price reduction and therefore lower prices will not cause any rush of buying.

3—Tire prices are so low that the industry as a whole is earning less than one per cent on its invested capital.

4—Methods used by some of the manufacturers are impairing the industry and exposing its leaders to the criticism of short-sightedness.

At the end of the year the industry will be bemoaning hard times and boards of directors will spend worried hours trying to find excuses to tell their stockholders for the lack of profits and balance sheets will be ingeniously juggled to present a favorable impression. In the last analysis, all this grief and discouragement has been brought upon the industry by its own lack of leadership and cooperative effort.

Some "Don'ts" for Rubber Goods

A FEW sound rules calculated to assist merchandizers of rubber goods to preserve their stocks in good condition have been recently circulated by the United States Rubber Company to its distributors. The suggestions made are well worth attention and are as follows:

"Don't store goods too long. Articles are made for use during the ensuing year and most of them can be kept more than a year without serious loss, but an effort should be made to avoid keeping articles in stock for several years.

"Don't store goods in a hot place. Boxes of goods kept near a radiator or stove are likely to be injured. All rubber goods deteriorate slowly at ordinary temperatures and this deterioration is accelerated at higher temperatures.

"Don't display rubber goods in a sunny window; the sunlight is bad for them. Some articles will stand up fairly well, but others will be ruined in a surprisingly short time. This is particularly true of thin articles.

"Don't let grease or oil stay on rubber articles; it tends to soften and spoil them.

"In general, it is well to store rubber goods in closed containers in a cool, dark room and not to keep them too long.

"Remember that heat, light and grease or oil all tend to spoil rubber and the longer the article is exposed to them the worse it is for the rubber.

"Fabric will rot easily if stored in a damp place and if subjected to water for too long a time. For this reason articles made up of rubber and fabric together should, if wet, be dried at room temperatures around sixty to seventy degrees as soon as possible.

"When rubber is boiled in water and sterilized, do not boil any longer than necessary. Boiling with alkali or soap will shorten the life of rubber. If it is necessary to clean rubber with soap, rinse with clear water at once. Cleaning rubber with gasoline is more injurious than with soap.

"Coating rubber with ordinary paint or similar materials generally proves harmful.

"Ozone deteriorates rubber under tension quite rapidly. The arc light is one source of ozone."

Some of these suggestions can be observed as advantageously by the housewife, the motorist and other consumers of rubber articles as by the rubber goods merchant.

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Representatives in all the rubber centers of the United States, Canada, England, France, Germany and the Middle East.

The Rubber Industry's CURRENT NEWS

Financial—Personals—New Rubber Products—
Building Operations—Manufacturing—Exports

BORLAND PRESIDENT OF MOHAWK RUBBER CO.

The resignation of S. S. Miller as president of Mohawk Rubber Company was announced on June 5, following a meeting of the board of directors of the company. Mr. Miller, who headed the group that organized the company 17 years ago, has been elected chairman of the board. He celebrated his 74th birthday this year and asked relief from the active direction of the firm because of his long service.

Charles Borland, former general manager of the Federal Electric Company, Chicago, Ill., has been named to assume the duties of president. Mr. Borland was long identified with the Insull interests in Chicago and with other successful enterprises in that city. Dr. R. H. Bishop of Cleveland was elected a director at the meeting of the board.

The Mohawk Rubber Company will shortly increase its authorized common stock from 125,000 to 150,000 shares and will set aside 15,000 shares for sale to its employees.

Engineers Visit Republic

Members of the Electrical Maintenance Engineers Association of Youngstown, O., visited the factories of the Republic Rubber Company in that city on June 12. After inspecting the plant and the exhibit of rubber products at the clubhouse, a dinner was served. An opening speech by President James C. Evans of the association was followed by talks on "The History of the Republic Rubber Company and Its Place in This Community," by R. M. Gattschall, advertising manager; "Rubber," by C. B. Mitchella, chief engineer; and "The Application of Industrial Control," by P. B. Harwood, electrical engineer of Cutler-Hammer, Inc.

General Preferred Dividend

Directors of the General Tire & Rubber Company have declared the 51st consecutive dividend of 1½ per cent on the preferred stock of the company. This will be paid on June 30 to stock of record as of the close of business on June 20.

The Crescent Insulated Wire & Cable Company, Trenton, N. J., is now preparing plans for a small addition to its factory in that city, the expansion being made necessary by increasing business.

Ohio Rubber Gets Contract

The Ohio Rubber Company, Willoughby, O., has just signed a contract with the Ford Motor Company, calling for regular shipments of rubber and steel running boards. More workers will be taken on and delivery to the Ford company will start in August, according to Henry Hallock, president, but no plans for factory expansion are under consideration as yet.

Boston Belting Co. Wind-up

As a final wind-up to the affairs of the Boston Belting Company, America's oldest rubber company at which Charles Goodyear spent much of his time in Roxbury, Mass., Francis B. Sears has offered to pay fifty cents a share for any preferred shares surrendered to the Boston Safe Deposit & Trust Company, 100 Franklin Street, Boston, Mass., before the close of business on August 15. This step is taken in behalf of his brother, Edmund H. Sears, who with George F. Willett were guarantors of this preferred stock and paid as long as they could the dividends which the corporation was unable to meet. The company was liquidated over three years ago and failed to pay its debts in full, leaving nothing for the stock.

PLANS ANNOUNCED FOR FALLS-COOPER MERGER

Plans to obtain control of the Falls Rubber Company, Chicopee Falls, O., and the Cooper Corporation, Findlay, O., through an exchange of stock were announced on June 4 by the Master Tire & Rubber Corporation, recently formed managing and holding concern.

The Master Corporation offers to exchange two and one-half shares of its common stock for one share of Falls preferred $25 par value and one share of Master common for two of Falls common.

One share of $100 par 7 per cent cumulative Master preferred is offered for one share of Cooper preferred $100 par, and one share of Master common for one of Cooper common.

While Master has authorized issue of $2,000,000 preferred, not more than $1,500,000 is to be issued in exchange for preferred stock of Cooper. No preferred will be issued for Falls preferred, a statement says.

Stockholders are informed that the Falls company has shown "substantial" deficits for 1928 and 1929 and Cooper large deficits during same periods, although it is added that the tire manufacturing division of Cooper showed a profit for 1928 .

NEW OFFICERS ELECTED BY AKRON CHEMICAL MEN

Members of the Akron Section of the American Chemical Society held their regular monthly meeting on June 7 and elected officers for the ensuing year. Those chosen by the group include the following: Dr. Webster N. Jones, B. F. Goodrich Company, chairman; Herman R. Thies, Miller Rubber Company, Inc., vice-chairman; Dr. William F. Zimmerli, Roessler & Hasslacher Chemical Company, secretary; Dr. John N. Street, Firestone Tire & Rubber Company, treasurer; Dr. Lorin B. Sebrell, Goodyear Tire & Rubber Company, Ray P. Dinsmore, Goodyear Tire & Rubber Company, and Dr. Harlan L. Trumbull, B. F. Goodrich Company, counselors.

AKRON EXPORT CLUB TO SEEK FOR MORE MEMBERS

A drive to increase the membership of the Akron Export Club of the Chamber of Commerce was launched this month at a business meeting of the organization held in the Akron City Club. A committee has been appointed for the purpose.

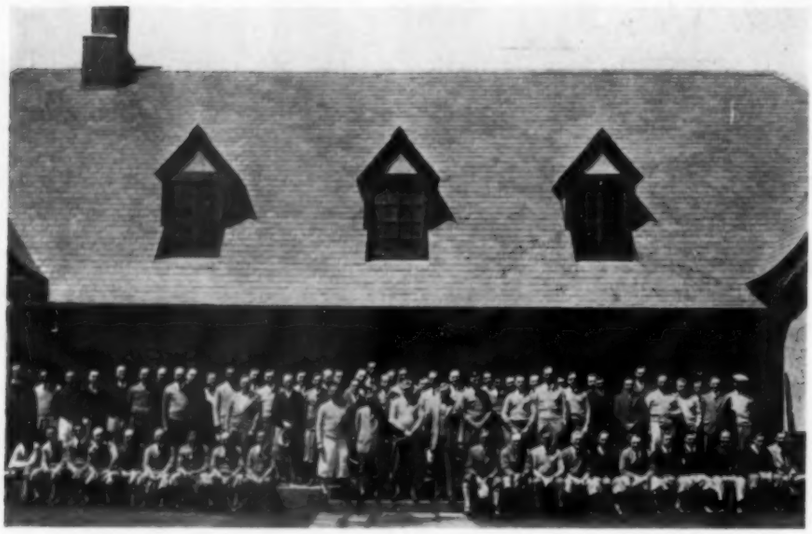
A program of activities was planned and a committee named to arrange for speakers at future meetings. This committee includes Dr. William Lloyd Davis, of Akron University; J. L. Cohill, Firestone Tire & Rubber Company; and C. E. Wagner, Republic Rubber Company.

Goodrich Closes for Inventory

The tire departments of the B. F. Goodrich Company will close down on June 28 for the annual inventory of stock and will reopen on July 7. The footwear department of the factory will close later for inventory, but the date of this period has not been fixed. Other departments will continue to operate without change.

JUSTUS DOANE ANDERSON, who retired as vice-president of the Fisk Rubber Company in 1927, has become associated with Jackson-Babbitt, Inc., commercial research engineers and business negotiators of New York City. Prior to his association with the Fisk Rubber Company, Mr. Anderson had been president of the Hartford Rubber Works, general sales manager of the United States Tire Company, and president of the Tire and Rim Association.

Firestone Opens New Employes' Clubhouse



THE Firestone Country Club, a private club of Firestone Tire & Rubber Company employes and others residing in Firestone Park, Akron, O., opened its new clubhouse on May 31, completing golf facilities sponsored by the rubber company, including two beautiful 18-hole courses. The two courses, which have been open for some time, and the clubhouse offer the finest industrial layout of its kind in the country.

The foursome shown standing on the steps of the clubhouse includes, from left to right, P. P. Sheeks, recreation directors of the Firestone Tire & Rubber Company; Harvey S. Firestone, president of the company; Mayor G. Lloyd Weil of Akron; and John W. Thomas, vice-president and general manager.

Goodyear Seeks Airship Expert

Representative Francis Seiberling of Akron appeared on June 17 before the Committee on Immigration of the House of Representatives on behalf of a bill permitting American manufacturers to bring into the United States experts from foreign countries under special act charging entrants to the immigration quotas of the countries involved. He made a short statement to the committee in which he pointed out that the Goodyear-Zeppelin Corporation desires to bring to Akron a German dirigible expert to assist in an advisory capacity in constructing the two Navy airships, but said that existing laws made it very difficult for such experts to enter.

The story of the growth of the Akron rubber industry from the first plant opened by Dr. B. F. Goodrich, was told in an Akron Chamber of Commerce radio program over station WADC on June 12.

CATALPO

for

Footwear

Trenton Manufacturers' Outing

The annual outing and dinner of the Rubber Manufacturers Association of New Jersey was held on June 17 at the Trenton Country Club. A. L. Viles, general manager of the Rubber Manufacturers Association, Inc., was a guest for the occasion. After the dinner, about 35 members participated in a golf tournament in which Ray Lambert won the low gross prize with a score of 82 while Horace T. Cook, president of the Hamilton Rubber Company, was a close second with 83.

William Henry Bristol

Professor William Henry Bristol, president of the Bristol Company, Waterbury, Conn., died on June 18 at the New Haven Hospital, New Haven. He was the inventor of the Bristol phone and of numerous recording instruments, many of which are widely used in the rubber industry. At the time of his death he was 70 years old.

James R. Robbins

James R. Robbins, head of the belting department of the Whitehead Brothers Rubber Company, Trenton, N. J., died on June 7 in his 35th year. Mr. Robbins, a World War veteran, had his home at East Nottingham Way, Hamilton Square, N. J. He is survived by his parents, a brother and a sister. Burial services were held on June 9 with interment at Trenton.

MERGER CALLED LOGICAL FOR RUBBER INDUSTRY

Speaking before the spring convention of the American Management Association last month, Ray B. Prescott, marketing counselor, told the organization that mergers in certain industries, including the automobile tire business are essential. "Some of the industries in which mergers are necessary to solve marketing problems and to increase earnings," Mr. Prescott said, "are the automotive, tire and textile industries.

"In the tire industry, there is excess capacity created during the war. There are five big companies and about 50 small ones. By combining several of the smaller companies producing tires, mechanical goods, and footwear, it would be possible to balance production schedules to a much greater degree than is now possible."

RUBBER COMPANY STOCKS UNDER 1929 LOW LEVELS

Goodyear, Goodrich, Firestone, Ajax and other leading rubber company stocks have either touched or fallen below their low levels of the October-November market collapse of last year during the current break in security prices which culminated on June 18. Goodrich, which recently issued a $30,000,000 flotation of debentures, and Firestone, which last year sold $60,000,000 in preferred stock, were particularly affected.

The Goodrich common stock, paying $4 in annual dividends, broke to a low of 22½, which would make its dividend yield nearly 18 per cent. At the same time its preferred shares fell to a low of 87¼. Firestone common touched a low of 20⅛, while its 6 per cent preferred stock sagged to 69⅞ as compared with its 1929 high of 98¾. Goodyear common touched its 1929 low of 60 and United States Rubber at 20 was only 5 points above its low of last November.

Closing prices of leading rubber company stock issues on June 18, compared with the close of June 4, are listed below, together with the high and low figures for the year:

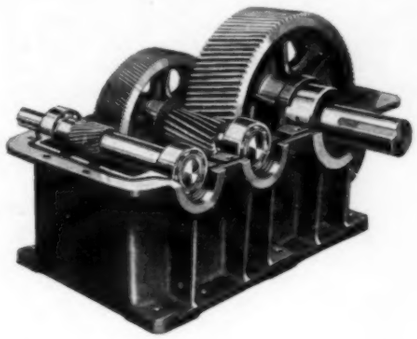
	Last Price		—1930—	
	June 18	June 4	High	Low
Ajax	1⅛	1½	2½	1
Amer. Hard Rubber	—	—	81	60½
Dayton "A"	—	—	3⅞	3¾
Fails	—	—	4¾	3
Faultless	—	—	37	34⅜
Firestone	20⅛	23¼	33¼	20¼
do. 6% pfd.	70	77	87⅞	69⅞
Fisk	2½	3⅝	5½	2⅜
do. 1st. pfd.	6⅝	13	21	6⅝
General	—	—	168	135
do. pfd.	86½	—	91	88
Goodrich	24	40¼	58½	22½
do. pfd.	87¼	—	104½	87¼
Goodyear	63¾	86½	96⅞	60
do. 1st. pfd.	95	—	102	90
India	18	—	25½	8½
Intercontinental	4¼	—	7½	4¼
Kelly Springfield	3	4⅛	6⅛	3
do. 6% pfd.	35½	—	39	29
Lee	5½	—	11	4⅝
Mohawk	9	14	16⅝	8
do. pfd.	—	—	55	50
Norwalk	1½	1¾	4	⅞
Pirelli	41	—	50¾	41
Raybestos-Manhattan	28¼	41¼	58⅞	28
Seiberling	6	8	18½	6
do. pfd.	—	—	78	40
U. S. Rubber	20⅛	30⅛	35	20
do. pfd.	44	54	63⅞	42⅛

New Equipment for Rubber Factories

Titan Speed Reducers

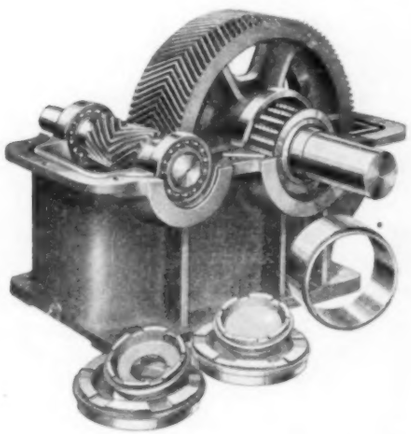
The Foote Brothers Gear & Machine Company, Chicago, Ill., has recently placed on the market a new line of anti-friction speed reducers under the name of IXL Titans. The reducers in this new line are available with either herringbone gears or helical gears, as desired.

The herringbone and helical reducers have many features in common. The cases are

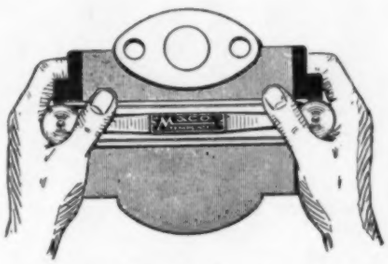


cast from close grained grey iron, treated to prevent flaking. Ribs are provided at each bearing for rigidity. The inside upper case is ribbed at the top as an added precaution against longitudinal vibration. No gaskets are used between halves, as accurate machining makes this unnecessary. Oil return grooves are provided for the return of the oil to the bottom of the case. Splash lubrication is standard. SKF bearings are used on high speed shaft, and Hyatt roller bearings on slow speed shaft.

On the single reduction units, the ratios range from 2.87 to 9.9. On the double re-



duction units, the ratios range from 9.95 to 96.2. Anti-friction bearings have been adopted as standard in the design of these reducers. The range of efficiency varies, depending upon the ratio used. On the single reduction unit it ranges as high as 98 per cent for low ratios and on the double reduction unit it ranges up to 96 per cent for low ratios.



Maco Adjustable Template

Said to take the most difficult profiles in a few seconds, the Maco template is simple and durable, and useful in any machine shop. Set in a substantial aluminum frame or housing, the Maco template is composed of a number of very fine strips of hard drawn brass, the thickness of each strip being .007 inch. These laminations are held in position by two special clamps, which are fitted with sections of corrugated rubber which definitely insure the security of the laminae from falling out.

When an exact template of any profile is required, all that is necessary is to loosen the screws and gently press the adjustable template against the contour. The result of such pressure is that the laminae take a perfect outline of the surface against which they are pressed, as in the pipe flange illustrated. The device is distributed by the American Maco Template Company, Inc., 44 Whitehall Street, New York City.

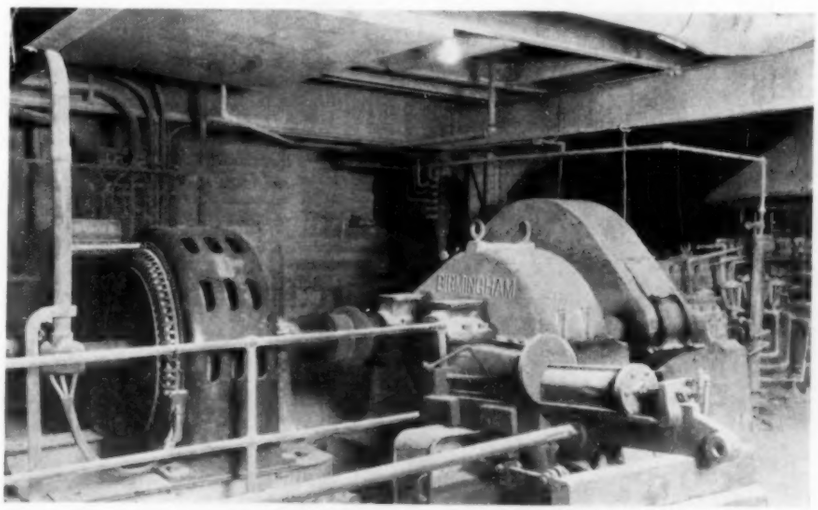
New Type of Remote Control

The DeFlorez system of remote manual control, perfected by Luis DeFlorez, a New York consulting engineer, is said to make it possible for an operator to maintain manual control of a valve or other movable device from a distance. A remarkable feature in the device is the ability of the operator to actually "feel" the operation of the remote unit.

This device uses self-synchronizing alternating current motors which have the property of remaining accurately in phase. When connected and energized, any power applied to one motor will be transmitted to the other with comparatively little distortion and their action can not only be used to transmit indications but also to transmit power necessary to effect control.

The receiving mechanisms can be applied to any type of valve or to effect any rotary motion desired. The mechanisms were originally constructed to take care of special conditions in the design of petroleum refining units, but provision has been made to make the device available for other uses. The Brown Instrument Company, Philadelphia, Pa., has undertaken the construction and sale of this equipment, and it is expected that in the course of the next few months it will be made available commercially.

Synchronous Motors for Driving Plasticators



THE Gordon plasticator is another application that has been successfully and economically driven by synchronous motors. The view above at the plant of a prominent rubber manufacturer shows a 250 h.p., 514 r.p.m., E-M synchronous motor driving such a plasticator. The motor operates at 80 per cent leading power factor, and thereby assists in plant power factor correction.

The requirements for the satisfactory operation of the plasticator are ample torques for starting, accelerating and pulling into step the mill, and constant speed. The synchronous motor is said to meet all these requirements, in addition to offering opportunity for correction of plant power factor. This installation was made by the Electric Machinery Manufacturing Company, Minneapolis, Minn., and has been in satisfactory operation at this rubber factory for several months.

Names in the News

THOMAS MIDGLEY, JR., vice-president of the Ethyl Gasoline Corporation, gave an illustrated lecture on "The Destructive Distillation of Rubber," before the Chicago Section of the American Chemical Society on June 20.

P. J. CASLISLE, of the Roessler & Hasslacher Chemical Company, was elected vice-president for Niagara Falls at a meeting of the Western New York Section of the American Chemical Society. H. V. DAVISS, of the same company, was elected secretary of the section.

DR. A. A. SOMERVILLE, vice-president of the R. T. Vanderbilt Company, New York City, has continued his lecture tour through Europe, speaking on June 16 at the fourth general assembly of the Deutsche Kautschuk Gesellschaft, the German society of rubber chemists and technologists, held at Frankfurt-on-the-Main. His topic was "Some Innovations in the Field of the Physical Testing of Rubber." Dr. Somerville discussed the same subject at a meeting on May 20 at the Maison des Centraux, Paris, under the auspices of M. VAN LEDE.

ROBERT D. WILSON, first of the 1929 class of airship pilots of the Goodyear Tire & Rubber Company to earn a transport license, has been assigned as pilot in charge of the *Mayflower*, new Goodyear blimp. Mr. Wilson, a Purdue man, is 23 years old and has spent more than 300 hours in the air under the tutelage of JACK BOETTNER and WARD T. VAN ORMAN.

H. K. RAYMOND, former vice-president and factory manager of the B. F. Goodrich Company, is recovering from injuries suffered early this month when his automobile left the road at Northfield, O., broke off a telephone pole and turned over several times in a field. He retired from active connection with the B. F. Goodrich Company in 1925.

SAMUEL BROERS, export manager of the Firestone Tire & Rubber Company, sailed on May 28 from Vancouver, B. C., on a business trip around the world. In addition to visiting Firestone distributors and representatives in the Far East, he will spend some time studying the rubber-producing countries.

H. W. NIEDERHAUSER, in charge of technical service at the Gadsden, Ala., plant of the Goodyear Tire & Rubber Company, has been awarded a service pin by the company after having completed 15 years of service.

E. R. WAITE, who has acted as western representative of the Rubber Service Laboratories Company, Akron, O., for several years, has resigned that position to become factory manager of the Sheller Manufacturing Company, Portland, Ind., makers of Shellerite steering wheels and other products.

General Rubber Company Elects Jones President

The General Rubber Company has announced the election of Arthur Jones, of London, as president. E. C. Schwab has been re-elected vice-president, and appointed manager of the New York office.

Mr. Jones has been associated with the company since 1907, and since 1927 has been managing director of General Rubber Company, Ltd., of London. He is one of the best known men in crude rubber circles of Great Britain and the Continent and has served as chairman of the Rubber Trade Association. In addition to his service in London he has been a frequent visitor to this country and has a wide acquaintance among the executives of most of the rubber manufacturing companies. He is familiar with rubber plantations and crude rubber in all foreign markets, and has visited the plantations area in the East.

The General Rubber Company is the largest and one of the oldest crude rubber organizations in the world. It has a well-established world-wide organization, with offices in New York, London, Liverpool, Singapore, Penang, Colombo, Medan, Para and Manaos — all important points in the crude rubber world. It controls the United States Rubber Plantations, Inc., and is itself a subsidiary of the United States Rubber Company.

SIDNEY WEINBERG, of the banking firm of Goldman, Sachs & Company, New York City, and WESSON SEYBURL, who has wide banking interests in Detroit, Mich., were elected directors of the B. F. Goodrich Company at a meeting of the board on June 10. They succeed A. H. NOAH, who has been a director of the Goodrich company since 1913 when that company acquired the Diamond Rubber Company, and C. E. COOK, general sales manager of the mechanical goods division, a position which he will continue to occupy.

R. J. BLAIR, pilot, and F. A. TROTTER, aide, will fly the entry of the Goodyear Tire & Rubber Company in the National Balloon Race which is scheduled to start from Houston, Texas, on July 4. An entry of the Cleveland Chamber of Commerce will be piloted by CHARLES H. ROTH and WILLIAM P. CAREY, JR., both of the Goodyear organization. One of the United States Navy entries will be handled by LIEUTENANT T. G. W. SETTLE and R. G. MAYER, both of whom are members of the Navy's inspection bureau at the Goodyear-Zeppelin Corporation plant.

P. W. LITCHFIELD, president of the Goodyear Tire & Rubber Company, has been named a member of the committee on manufactures of the Chamber of Commerce of the United States. Mr. Litchfield, who is a director of the chamber, has also been asked to assume leadership in the affairs of the body in the eastern Ohio district, with the idea of keeping local chambers in closer touch with the activities of the national organization.

JOHN R. LOTZE, general manager of the General Tire & Rubber Company branch at Canton, O., addressed members of the Exchange Club of that city on June 6 in connection with the showing of a motion picture on the company's recent "blow-out tire test."

CHARLES W. SEIBERLING, vice-president of the Seiberling Rubber Company, has been elected president of the board of trustees of Kent State College at Kent ,O. He succeeds NORMAN W. SENNHAUSER, of New Philadelphia, O.

DR. ARCHIBALD T. MCPHERSON of Marceline, Mo., was appointed chief of the Rubber Division of the Bureau of Standards on June 14. He succeeds P. L. WORMELEY, who has been transferred to be head of the new Section of Specifications and Testing, which will be established July 1. Dr. McPherson has been connected with the Bureau of Standards since January, 1918, but has served continuously only since 1923, specializing on research covering the electrical properties of rubber.

LEROY B. TOMPKINSON, general foreman of the truck tire department and manager of the "flying squadron" at the Goodyear Tire & Rubber Company, at Akron, O., has been appointed general superintendent of the company's plant at Los Angeles, Cal. An Akron University man, Mr. Tompkinson started work with Goodyear several years ago in the division superintendent's office and was named foreman in 1926 and head of the squadron two years later. At the Los Angeles plant he will succeed EDWIN J. THOMAS, who will return to Akron to become assistant to CLIFTON C. SLUSSER, vice-president and factory manager.

HAROLD D. REICHARD, superintendent of the Pharis Tire & Rubber Company, Newark, O., was the principal speaker before the meeting of the Kiwanis Club of that city on June 9. He discussed the origin of rubber and the manufacture of tires. FRED P. CROSS, of the Pharis company, was in charge of the program for the meeting.

CHANNING P. HUNTINGTON has been appointed associate editor of the *"U. S." Rubber News*, internal house organ of the United States Rubber Company, and will also edit *Rubber Overseas*, a new publication of the United States Rubber Export Company, Ltd.

Rubber Goods and Specialties

Dragonfly Beach Float

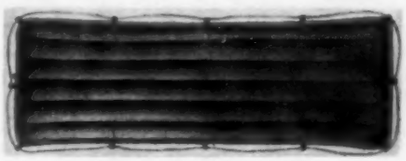
Among the line of Swim Toys manufactured by the Seamless Rubber Company, New Haven, Conn., is this beach float which inflates to the form of a dragonfly. It is attractively colored in red, yellow and green and is rapidly winning popularity at beach and lake resorts and swimming pools.

It is 58½ inches in length and, when inflated, will support the heaviest swimmer in the water. The Swim Toy line of the Seamless Rubber Company also includes horse, camel, pony, toad and other attractive floats.

Hartcraft De Luxe Tire

The latest addition to the line of the Giant Tire & Rubber Company, Findlay, O., is the Hartcraft De Luxe casing, built with six plies, extra long staple fabric and extra layers of rubber friction stock between the plies. Large size, artistic design, thick

special ebony black tread, white sidewalls, all combine to give this casing an attractive appearance. An unusual non-skid design in the tread is said to give it superior gripping qualities. The Hartcraft De Luxe is guaranteed on the same principle as the company's standard quality tires, except that the time is increased to 18 months for passenger car service and to 9 months for commercial use.



Aqua Air Raft

Adaptable for surf-riding, aqua-planing, as a floating raft or as a beach mattress, this Aqua Air Raft is being offered to the sporting goods trade by the Converse Rubber Company, Malden, Mass. The ribs run lengthwise, and the self-cover of tan jeans is vulcanized to a heavy rubber coating on both sides. A Schrader lock valve is provided with a connection for a standard size tire pump. A heavy life line is supplied, and the raft has twelve cemented loops for this purpose. In size, it is 25 inches wide and 75 inches long.

Athletic Shoe Sole

A boot or shoe for football or like sports, devised by D. W. Mortlock and F. Niblock, of Singapore, has a one-piece sole molded of rubber with integrally-molded anti-slipping studs or bars provided, with an integrally-molded toe-cap and also, if desired, with a heel-cap. The sole may be reinforced in known manner by a layer of canvas or linen incorporated in the sole during molding and having projections extending into the studs.

Rubber-Textile Mats

The Rheinische Gummi und Celluloid Fabrik, Mannheim-Neckarau, Germany, is introducing Cellguma floor mats made of strong textile fabric impregnated with rubber. The mats are colored on both sides and are made purposely rough, so that slipping is impossible, even if the mat is wet. They do not absorb water in the manner of sponge rubber mats and they are easily washable.

Teeth-Cleaning Appliance

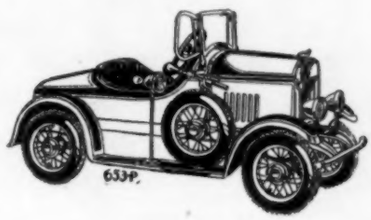
An improved appliance for cleaning the teeth and massaging the gums, patented by R. D. Bell, Sydney, Australia, comprises a finger stall, formed of rubber and provided with projections. It is also characterized by an extension adapted to be held in the hand. The finger stall is reinforced with a band, and the projections may be integral with the part or may be made separately and vulcanized thereto.

Rubber-Fabric Neckties

Neckties in either the conventional four-in-hand, bows or other varieties are being made in France from sheets and threads of rubber or rubberized fabric. Many colors are offered and surface finished resemble silk or other fabrics.

Toy Cadillac Car

A feature of the Blue Streak line of the Toledo Metal Wheel Company, Toledo, O., is the No. 653-P Cadillac, a children's vehicle 59 inches long with an all steel chassis. Adjustable rubber pedals furnish the motive power to the large ball bearing wheels with tangent spokes and chromium plated hub



caps and hubs. The tires are real Federal balloons in a 2.50 by 12.75 size which inflate to a pressure of 25 pounds and carry the standard Federal tire guarantee covering defective material or workmanship. These oversize tires are of one-piece inseparable ply fabric construction with a one-inch nonskid tread. Six wheels and tires are furnished as regular equipment, the two spare wheels being mounted on the running boards. The company also makes children's cars in imitation of other popular automobiles, trucks and airplanes.

Carnival Balloon Assortment

A new assorted package of toy balloons termed the Carnival Special has been introduced by the Oak Rubber Company, Ravenna, O. It is made up of a variety of the

most popular fancy balloons in the Oak line, including balloons with striped, circular, Onyx, animal and circus designs in all colors. The Carnival Special package offers the advantage of variety in a minimum stock, the balloons being packed one gross to the box. The company is offering one assortment of compound, or opaque balloons, and one assortment of transparent balloons.

Current Crude Rubber Items

LONDON RUBBER IMPORTS LOWER THAN IN APRIL

Imports of crude rubber into London during May were 312,223 centals, against 354,269 centals in April and 227,477 centals in May, 1929, according to the London Board of Trade Report received by the Rubber Exchange of New York.

Exports from London for May were 91,336 centals, against 61,768 centals in the previous month and 112,960 centals in May last year.

London shipments to America during May totaled 2,318 centals, against 584 centals in the preceding month and 12,972 centals in May, 1929.

INDIAN HEMP PROVES A SOURCE FOR RUBBER

According to the latest Missouri Botanical Garden Bulletin, published at St. Louis, Mo., dogbane, or Indian hemp, known scientifically as the *Apocynum*, is shown by research to have a rich rubber content. This common weed grows prolifically through several western states.

"One of the most significant factors concerning the study of the latex of *Apocynum*," says the bulletin, "is that the rubber content increases to a large extent with drought and infertility of the soil."

Rubber Compendium Announced

Announcement has been made of the publication in the near future of "Standring's Rubber Compendium," by Herbert Standring, formerly associated with several English rubber trade papers. This is described as a "compilation of a complete dossier, guide and compendium of rubber" and will be offered at the price of 10s 6d.

Dr. de Vries Retires

Professor O. de Vries resigned the position of director of the Proefstation voor Rubber at Buitenzorg, Java, last month after 15 years of service. During that time his researches on latex and crude rubber at the testing station won him recognition throughout the rubber industry of the world. He is still a correspondent of the Royal Academy of Science at Amsterdam and extraordinary professor of chemistry at the medical school of the University of Batavia.

HERBERT WRIGHT NAMED FOR KNIGHTHOOD HONORS

The royal birthday honors list issued early this month contained the name of Herbert Wright, chairman of the executive committee of the Governing Body, Imperial College of Science and Technology, South Kensington, who was awarded the honor of knighthood for his services to the college. Sir Herbert, as he now is known, began his connection with the rubber industry in the early days of plantation rubber, serving from 1900 to 1903 as scientific advisor to the director of the Royal Botanic Gardens, Peradeniya, Ceylon, and from 1903 to 1907 as controller of the Peradeniya Experimental Station.

Since 1907, he has been actively associated with the Rubber Estates Agency, has become a director of numerous plantation companies, and this year was elected vice-chairman of the Rubber Growers' Association, Inc. He was also for more than ten years editor of the *India-Rubber Journal*.

The Federated Malay States government has proposed for the general benefit of the rubber industry to appropriate $2,500,000 from a special reserve fund for experimental research and propaganda.

MALACCA RUBBER ESTATE NETS $263,000 IN 1929

Profit of the Malacca Rubber Plantations for the year ended December 31, 1929, totaled £54,018, or approximately $263,000, as compared with £53,766 in the previous year and with £114,545 in 1927. The shares of the Malacca Rubber Plantations are listed on the New York Curb Exchange and have been traded since April of last year on that market.

Report for year 1929 states that area under rubber at Dec. 31 was 21,558.14 acres, of which 18,964.07 acres were mature, 115 acres having been planted during year on Fortrose Division. On Whittington Division 978.55 acres were planted with oil palms, and a further area of 1,000 acres was felled. Of this latter area 300 acres are now in course of being planted. Output was 6,419,457 pounds, as against 4,988,910 pounds for 1928. Estimated output for current year is 6,484,000 pounds, but this is subject to modification owing to decision of directors to adhere to scheme of Rubber Growers' Association for a tapping holiday during May. Of 1930 crop, 800,800 pounds have been sold forward at an average price of 11.21d. per pound landed in London.

A conditional agreement has been entered into by this company, Linggi Plantations, and United Sua Betong Rubber Estates whereby three parties agree to sell their adjoining oil palm estates in Central Johore to a new company to be formed with an authorized capital of £600,000. Price to be paid to this company is to be that number of fully-paid shares which at par is equivalent to expenditure on area to Dec. 31 last, plus repayment in cash of all subsequent expenditure. Through greater bulk to be handled, amalgamation will lead to considerable economies in working, particularly in transport. It is intended to plant up an additional 2,333 acres, bringing planted area up to 8,300 acres, and there is ample reserve selected land for further extensions if and when they be decided upon.

The joint committee of Anglo-Dutch growers will meet in London June 26 to consider further restrictive measures.

Closing Prices on Rubber Exchange of New York, Inc.

FROM JUNE 4 TO JUNE 18, 1930

		Spot	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Sales
No. 1 Standard Contract of 10 Tons															
June	4	——	13.10	13.22	13	13.63	13.78	13.91	14.04	14.22	14.40	14.58	14.76	14.94	62
	5	——	12.65	12.82	13.02	13.22	13.42	13.52	13.65	13.84	14.03	14.22	14.42	14.62	60
	6	——	12.90	13.02	13.16	13.30	13.45	13.60	13.75	13.94	14.12	14.30	14.45	14.60	7
	7	——	12.85	12.95	13.10	13.25	13.43	13.51	13.65	13.84	14.02	14.22	14.42	14.60	7
	9	——	12.65	12.75	12.90	13.05	13.17	13.29	13.40	13.60	13.80	14.00	14.20	14.40	6
	10	——	12.00	12.12	12.27	12.42	12.54	12.65	12.80	12.98	13.17	13.35	13.53	13.71	89
	11	——	11.95	12.05	12.17	12.40	12.54	12.66	12.82	12.98	13.16	13.32	13.50	13.68	49
	12	——	12.05	12.25	12.44	12.63	12.82	13.01	13.20	13.36	13.51	13.67	13.83	13.99	55
	13	——	12.22	12.32	12.52	12.72	12.90	13.07	13.25	13.40	13.55	13.65	13.87	14.04	4
	14	——	11.95	12.05	12.20	12.36	12.54	12.71	12.85	13.03	13.20	13.37	13.52	13.67	2
	16	——	11.70	11.80	12.01	12.23	12.39	12.55	12.72	12.90	13.07	13.24	13.41	13.58	37
	17	——	11.90	12.00	12.20	12.40	12.57	12.73	12.90	13.05	13.20	13.35	13.51	13.67	20
	18	——	11.70	11.80	11.97	12.15	12.33	12.51	12.70	12.86	13.01	13.17	13.33	13.49	34
"A" Contract of 2½ Tons															
June	4	13.20	13.10	13.10	13.20	13.40	13.60	13.70	13.80	14.00	14.20	14.40	14.60	14.80	198
	5	12.90	12.60	12.80	12.90	13.00	13.20	13.30	13.50	13.70	13.90	14.00	14.20	14.40	228
	6	13.00	12.70	12.90	13.00	13.10	13.30	13.40	13.50	13.70	13.90	14.00	14.30	14.50	55
	7	12.90	12.60	12.80	13.00	13.10	13.30	13.40	13.50	13.70	13.80	14.00	14.20	14.40	61
	9	12.80	12.40	12.60	12.80	12.90	13.10	13.20	13.30	13.50	13.60	13.80	14.00	14.20	157
	10	12.25	11.90	12.00	12.10	12.20	12.40	12.50	12.60	12.80	13.00	13.20	13.40	13.60	573
	11	12.10	11.80	11.90	12.10	12.30	12.50	12.66	12.70	12.90	13.00	13.10	13.30	13.50	443
	12	12.12	12.00	12.10	12.30	12.50	12.70	12.80	13.00	13.20	13.30	13.40	13.50	13.60	413
	13	12.18	12.10	12.20	12.30	12.50	12.70	12.80	13.00	13.10	13.30	13.40	13.70	13.90	112
	14	12.00	11.80	11.90	12.00	12.20	12.40	12.50	12.70	12.90	13.00	13.10	13.30	13.50	109
	16	11.97	11.60	11.70	11.90	12.00	12.20	12.40	12.50	12.70	12.80	13.00	13.20	13.40	596
	17	12.00	11.70	11.90	12.00	12.20	12.40	12.60	12.80	12.90	13.00	13.20	13.40	13.60	198
	18	11.80	11.60	11.70	11.90	12.00	12.10	12.30	12.50	12.60	12.80	13.00	13.20	13.40	264

CATALPO
for
Cushion Stocks

NEW LACQUER PROTECTS RUBBER ON AUTO CABLES

Chemists at the laboratories of E. I. du Pont de Nemours & Company, working in cooperation with the technical staff of the Packard Electric Company, have developed a lacquer which, it is claimed, when applied to ignition cables of automobiles increases the general efficiency of the car ten per cent and more. This especially compounded lacquer is used for finishing the cotton braid surrounding the rubber covering of ignition cables. It is flexible at temperatures as low as zero degrees F. and as high as 275 degrees F.

The new lacquer was developed because scientists have discovered that an atmospheric condition under the hood of the automobile, similar to that caused by a thunder storm when it releases ozone, is sometimes responsible for ignition failure. The trouble is due to what is known as a corona action, an electrical phenomenon that takes place when high voltage is carried by an insulated conductor. This may be seen at night as a purplish glow along the surface of a high-tension line. The chemical action which is set up by corona around automobile ignition cables or spark plug wires liberates ozone which causes the rapid deterioration of the rubber insulation of the wires.

The new lacquer fully protects the rubber from the effects not only of ozone but also of oil and gasoline. The exclusion of air by the lacquer guards against oxidation of the rubber, thereby prolonging its life.

Hazard Opens Boston Office

The Hazard Advertising Corporation, 295 Madison Avenue, New York City, has opened a branch at Boston, Mass., in charge of Theron S. Curtis. Mr. Curtis, a graduate engineer who joined the Hazard organization early in May, was a specialty engineer for the American Steel & Wire Company in Worcester and for ten years president of the T. I. Smith Company, manufacturing jewelers of Boston. The Boston office is at 950 Park Square Building in that city.

Colledge Cleveland Office

E. W. Colledge, Inc., general sales agent, has opened a branch office at 616 Guardian Building, Cleveland, O., and will hereafter market its various products direct. The firm handles a line of destructively distilled pine products.

CATALPO

for

Inner Tubes

Race Drivers Honor Firestone

Members of the Race Drivers' Association, just before the start of the International 500-mile Sweepstakes at Indianapolis, Ind., on May 30, presented Harvey S. Firestone, president of the Firestone Tire & Rubber Company, with a silver medal. Billy Arnold, the winning driver, and all of the first ten racers to cross the finish line used Firestone tires.

Government Specifications

The Federal Specifications Board is submitting to representative manufacturers a proposed revision of the federal specification for pneumatic hose. The board will send copies of this specification to any firm interested and will be glad to receive any comment or suggestions as to changes which may be thought desirable. These comments should be sent to reach the board by July 17 to receive attention from the technical committee considering the subject.

Goodyear Stock for Employes

The board of directors of the Goodyear Tire & Rubber Company has set aside a block of preferred stock, which may be purchased by employes who are at least 21 years of age and have at least one year of continuous service. The amount of stock an individual may purchase is limited and it will be sold at par value of $100 a share on payments which may be deducted from the pays or salaries of the purchasers. The sale will close June 30. The company has also inaugurated an employes' savings plan.

French Engineers at Akron

A party of 26 French automotive engineers visited Akron on June 2 as guests of the Goodyear Tire & Rubber Company and the Goodyear-Zeppelin Corporation and inspected the plants of these companies. The French engineers also spent several days at Detroit during which they visited the factory of the United States Rubber Company and then proceeded to the summer session of the American Society of Automotive Engineers at French Lick, Ind. B. J. Lemon, field engineer of the United States tire department, acted as host to the group during their stay at the Detroit tire factory.

Consulting Rubber Technologist

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Telephones: Barberton 828, Portage 5895W

BROWN INSTRUMENT CO. AGAIN ADDS TO PLANT

The increasing demand for pyrometers, flow meters, and other industrial instruments manufactured by the Brown Instrument Company, Philadelphia, Pa., necessitated additions to their plant in 1928 and 1929. The continuing growth of the business having again justified expansion, the Brown Instrument Company has just let a contract for 40,000 square feet of additional floor space to the Robert E. Lamb Company of Philadelphia, Pa. Mechanical and electrical equipment will be installed under separate contracts with local concerns.

This extra space will be in the form of two additional floors on all of the new two-story concrete sections of the plant. The plans for the work were prepared by the Ballinger Company of Philadelphia, Pa., under the supervision of W. E. Camp, industrial engineer of the Brown Instrument Company. Construction will be started very shortly and the new space will be occupied early this Fall.

New Carbon Black Plant

Carbon Products, Ltd., will erect a $250,000 factory in Los Angeles, Cal., in the near future for the production of carbon black and other materials. The plant will have a capacity of 30,000 pounds of carbon, carbon black and lampblack daily.

The Anroxylin Chemical Corporation has purchased the plant of Raritan Rubber, Inc., at New Brunswick, N. J. The Raritan firm was merged last year with the Lambert Tire & Rubber Company, Akron, O.

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LATE MARKET PRICES

RUBBER—COTTONS AND FABRICS—CHEMICALS

NEW YORK, JUNE 18, 1930

RUBBER

Crude

WHILE the current price of crude rubber has not quite reached the record low level of 11½ cents established on June 25, 1921, the duration of the present decline shows signs of extending over a much longer period than that of nine years ago. Current bidding for the commodity is at a price of 11¾ cents a pound, but it is believed that no actual sales have been executed on the outside market below the 12-cent level. On the Rubber Exchange, however, July rubber has sold for three successive days at 11.70 cents a pound.

General opinion seems to consider that the May tapping holiday was a "failure," but it is doubtful whether the Dutch and English promoters of this movement could have logically expected better results or hoped for the removal of 30,000 tons from the market to have any real influence on the position of the commodity.

The last time crude rubber reached such low levels the British government invoked the club of restriction through the Stevenson Act. In view of the current feeling against our new tariff law, it is not unlikely that that government will again heed any similar request for aid from the plantation interests.

Prices quoted on the New York outside market on June 18 were as follows:

Plantations—

Ribbed Smoked Sheets—			
Spot-June		.11⅝@	.12
July		.11⅝@	.12
Aug.-Sept.		.12⅛@	.12⅜
First Latex, crepe spot		.12 @	.12¼
Amber Crepe, No. 2		.11⅝@	.11⅝
Amber Crepe, No. 3		.11¼@	.11⅜
Amber Crepe, No. 4		.10⅝@	.11
Brown Crepe, Clean thin		.11¼@	.11⅜
Brown Crepe, specky		.10¾@	.11
Liquid Latex, per gal.		.90 @	1.25

Paras—

Up-river Fine		.14 @	.14⅜
Up-river Medium		Nominal	
Up-river Coarse		.07 @	.07¼
Acre Bolivian, fine		.14⅛@	.14⅜
Caucho Ball, Upper		.07 @	.07¼
Islands, fine		Nominal	

Centrals—

Central, scrap		.07 @	.07¼
Esmeraldas		.07 @	.07⅓

Balata—

Block, Colombia		Nominal	
Block, Ciudad		.43 @	.44

LONDON MARKET

Standard Ribbed Smoked Sheets—Buyers		
Spot-June	@	6 d
July-Sept.	@	6⅛d

SINGAPORE MARKET

Standard Ribbed Smoked Sheets—Sellers		
Spot	@	5⅝d

Scrap

With the crude rubber price level near the lowest point in history, the lot of the scrap rubber dealer is not a particularly happy one. Collections are difficult and prices lower, as the following quotations show:

(Prices to Consumer)

Auto tire peelings	ton	27.50	@30.00
Standard White auto	ton	40.00	@42.50
Mixed auto	ton	17.50	@19.00
Bicycle tires	ton	15.00	@17.00
Clean solid truck tires	ton	24.50	@25.00
Boots and shoes	cwt.	1.38	@ 1.40
Arctics, untrimmed	lb.	.00⅞@	.01
Inner tubes, No. 1	lb.	.07 @	.07¼
Inner tubes, No. 2, compounded	lb.	.03⅝@	.03¾
Inner Tubes, Red	lb.	.03⅝@	.03¾
Air Brake Hose	ton	17.50	@20.00
Rubber Hose	ton	17.50	@20.00

Reclaimed

Despite the drop in crude rubber consumption during May, domestic absorption of reclaimed rubber is estimated to have gained in that month by the Rubber Manufacturers Association. Its own figures put May reclaim consumption at 17,473 long tons as compared with 17,321 long tons in April. Late prices for the various grades follow:

High Tensile

Super-Reclaim No. 1 Black	lb.	.10¾@	.11
High Tensile Red	lb.	.10½@	.10¾

Shoe

Unwashed	lb.	.06¾@	.07
Washed	lb.	.09 @	.09¼

Tube

No. 1 (Floating)	lb.	.11½@	.12
No. 2 (Compounded)	lb.	.08¾@	.09

Tires

Black	lb.	.06¾@	.07
Black, selected tires	lb.	.07 @	.07¼
Dark Gray	lb.	.08 @	.08½
Light Gray	lb.	.09¼@	.09½
White	lb.	.11 @	.11¼
Truck, Heavy Gravity	lb.	.06¾@	.07
Truck, Light Gravity	lb.	.07 @	.07¼

Miscellaneous

Mechanical blends	lb.	.05 @	.05½
Red	lb.	.10½@	.11

COTTON and FABRICS

Cotton

AFTER holding for considerable time aloof from the general downward tendency of other commodities, raw cotton has joined the others with a rush and outstripped even rubber in the velocity of its decline. On June 16 the spot price for middling upland cotton closed at 13.45 cents a pound, as against 16.50 cents on May 16.

Aside from the decline in the stock markets and other commodity markets, there have been some distinctly bearish factors contributing to the fall in cotton. Weather conditions in the South have been generally favorable for the growing crop, and the standard cotton cloth statistics covering May were disappointing. According to the New York Cotton Exchange Service, the world carry-over of American cotton on July 31 may total 5,800,000 bales compared with 4,474,000 bales last year.

The high, low and closing prices on the New York Cotton Exchange on June 18 were as follows:

	High	Low	Close June 18	Close June 4
July	13.61	13.20	13.55	15.79
Oct.	12.94	12.59	12.92	14.24
Dec.	13.05	12.70	13.02	14.30

Tire Fabrics

In sympathy with raw cotton, tire fabric prices have shown marked declines, closing as follows:

CORD

Peeler, carded, 23/5/3	lb.	.42¼@	.42½
Peeler, carded, 23/4/3	lb.	.44¾@	.45
Peeler, carded, 13/3/3	lb.	.38½@	.39
Peeler, carded, 15/3/3	lb.	.39½@	.40
Egyptian, carded, 23/5/3	lb.	.48¼@	.48½
Egyptian, combed, 23/5/3	lb.	.53 @	.53½

CHAFERS

Carded, American, 8 oz.	lb.	.36½@	.37
Carded, American, 10 oz.	lb.	.37½@	.38
Carded, American, 12 oz.	lb.	.36 @	.37
Carded, American, 14 oz.	lb.	.35 @	.40

LENO BREAKER

Carded, American, 8¼ oz.	lb.	.37 @	.41
Carded, American, 10¼ oz.	lb.	.37 @	.41

SQUARE WOVEN

Carded, American, 17¼ oz. 23-11 ply	lb.	.42½@	.43
Carded, American, 17¾ oz. 10-ply	lb.	.35 @	.35½

Sheetings

Prices on sheetings have fallen off fractionally during the past fortnight. Late quotations, according to the Textile Brokers' Association, were as follows:

40-inch, 2.50-yard	yd.	— @	.10
40-inch, 2.85-yard	yd.	.08¾@	.08⅞
40-inch, 3.15-yard	yd.	.09⅛@	.10
40-inch, 3.60-yard	yd.	.08¼@	.08⅜
40-inch, 3.75-yard	yd.	.07 @	.07⅛
40-inch, 4.25-yard	yd.	.06 @	.06⅛

Ducks

Unlike other fabrics, cotton ducks have held firmly in price during the past two weeks. The quotations for the active grades remain as follows:

Belting and Hose	lb.	.33 @	.34
Enameling	lb.	.32 @	.32½
Single filling	lb.	.14 @	.14½
Double filling	lb.	— @	.16

CHEMICALS

EXCEPT for gum rosins, which continued their downward course, compounding ingredients and chemicals used in the rubber industry have been firm in price and have not followed the lead of the commodity markets. The demand for the well known types of accelerators, anti-oxidants and rubber colors has continued undiminished, and suppliers of these materials are looking forward to a very busy third quarter of the year. Rubber manufacturers were still taking on smaller quantities of carbon black than they did last year, but sellers of the black did, however, notice a slow but gradual improvement and hope that the situation will be normal by the fall. Prices for this material remain unchanged.

ACCELERATORS

Organic

A-1	lb.	.24 @	.27
A-5-10	lb.	.33 @	.36
A-7	lb.	.55 @	.59
A-11	lb.	.62 @	.66
A-16	lb.	.57 @	.61
A-19	lb.	.58 @	.62
A-20	lb.	.64 @	.68
A-32	lb.	.90 @	.95
Aldehyde ammonia, crystals	lb.	.65 @	.70
Aniline oil, drums, f.o.b. works	lb.	.15 @	.16
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.42 @	.44½
Diphenylguanidine	lb.	.30 @	.32½
Dipsol	lb.	4.30 @	4.50
Ethylidene aniline	lb.	.45 @	.47½
Formaldehyde aniline	lb.	.40 @	.42½
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.58½@	.61
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.37½@	.40
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.75 @	—
R & H 40	lb.	.40 @	.42½
R & H 50	lb.	.40 @	.42½
R & H 397	lb.	.75 @	.77½
R-2	lb.	1.95 @	2.15
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Tensilac, No. 39	lb.	.40 @	.42½
Tensilac, No. 41	lb.	.50 @	.52½
Thermio F	lb.	.50 @	.55
Thiocarbanilid, drums	lb.	.25½@	.28½
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.62½
Tuads	lb.		
Ureka	lb.	.75 @	1.00
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z 88	lb.	.50 @	.60
Zimate	lb.		

Inorganic

Lead, sublimed blue	lb.	.08¼@	—
Lead, white	lb.	.08½@	.08¾
Litharge, domestic	lb.	— @	.08¼
Magnesia, calcined, light	per 100 lb.	5.35 @	5.45
heavy	per 100 lb.	3.65 @	3.75

COLORS

Blacks (See Compounding Materials)

Blues

Prussian	lb.	.35 @	.36
Ultramarine	lb.	.06 @	.32

Browns

Sienna, Italian	lb.	.05½@	.12½
Umber, Turkey	lb.	.04½@	.07

Greens

Chrome, light	lb.	.30 @	.32
medium	lb.	.31 @	.33
dark	lb.	.34 @	.36
Chromium Oxide, bbl.	lb.	.34½@	.35½

Reds

Antimony crimson, 15/17	lb.	.40 @	.44
sulfur, free	lb.	.56 @	.66
golden 15/17 F.S.	lb.	.20 @	.25
Indian English	lb.	.08 @	.11
Domestic (Maroon)	lb.	.11 @	—
Oximony	lb.	.18¼@	—
Red oxide, pure	lb.	.10 @	.12
Venetian red	lb.	.03 @	.06
Vermillion, quicksilver, English	lb.	1.75 @	1.80

Whites

Lithopone, Akcolith	lb.	.05 3/5@	.06
Lithopone, Albalith	lb.	.05¼@	.05¾
Lithopone, Azolith	lb.	.05¼@	.05¾
Lithopone, Vanolith	lb.	.05¾@	—
Titanox B, f.o.b. St. Louis,	lb.	.07¼@	.07¾
Titanox C, f.o.b. St. Louis,	lb.	.07¾@	.08¼

Zinc Oxide—American Process

American Azo:			
ZZZ (lead free)	lb.	.06½@	.07
ZZ (leaded)	lb.	.06⅝@	.06⅞
Horsehead Brand:			
Special	lb.	.07 @	.07½
XX Green	lb.	.07 @	.07½
XX Red, lead free	lb.	.06½@	.07
Kadox, black label	lb.	.10⅜@	.10⅞
blue label	lb.	.09⅜@	.09⅞
red label	lb.	.08 @	.08½

Zinc Oxide—French Process

White seal	lb.	.11⅝@	.11⅞
Green seal	lb.	.10⅝@	.10⅞
Red seal	lb.	.09⅝@	.09⅞

Yellows

Chrome	lb.	.17 @	.17½
Ocher, French medium	lb.	.02 @	.02
domestic	lb.	.01⅝@	.02

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85 @	24.50
Ammonia carbonate, lump	lb.	.07½@	.07¾
Asbestine	ton	14.75 @	18.00
Barium carbonate	lb.	.03½@	.05
Barium Dust	lb.	.05 @	.06
Barytes southern off-color	ton	12.00 @	18.00
Western prime white	ton	23.00 @	—
imported	ton	27.00 @	36.00
Basofor	lb.	.04½@	—

Blacks

Arrow "Aerfloted"	lb.	.05½@	.11
Bone Black	lb.	.07 @	.08½
Carbon, compressed	lb.	.05 @	.10
Carbon, uncompressed	lb.	.05 @	.10
Disperso, f.o.b. Louisiana	lb.	.051 @	—
Disperso, f.o.b. Texas	lb.	.05 @	—
Drop Black	lb.	.06 @	.14
Fumonex	lb.	.04½@	.08
Excello, compressed	lb.	.05 @	.09
Gastex, f.o.b. Texas	lb.	.04¼@	.05½
Lamp Black	lb.	.10 @	.40
Micronex	lb.	.05½@	.11
Thermatomic-Thermax	lb.		
Flex	lb.		
P-33	lb.		
United carbon, fob Tex.	lb.	.05½@	.11
Velvetex carbon	lb.	.04 @	.06
Blanc fixe dry f.o.b. works	ton	75.00 @	90.00
Carrara filler	lb.	.01¾@	.02
Catalpo (fact.)	lb.	.02 @	—
Clay, China, domestic	ton	8.00 @	9.00
Aerfloted Suprex	ton	16.00 @	22.00
Congaree, c. l. f.o.b. mine	ton	9.00 @	—
Dark Blue Ridge	ton		
Dixie	ton		
Langford	ton		
Lexington	ton	10.00 @	22.00
Mineral Flour, c. l. fob mine	ton	20.00 @	28.00
Par	ton		
Tensulite		15.00 @	—
Glues, extra white	lb.	.22 @	.26
medium white	lb.	.20 @	.24
Magnesia, carbonate	lb.	.08¾@	.11
Mica, white water grnd.	lb.	.06 @	.08
Off color (biotite)	lb.	.05 @	.07
Rotten Stone powdered)	lb.	.02 @	.05
Soapstone, powdered	ton	15.00 @	22.00
Starch, powdered	cwt.	3.72 @	4.02
Talc, domestic	ton	12.00 @	15.00
Pyrax A	ton		
Whiting, commercial	cwt.	— @	1.00
English cliffstone	cwt.	1.75 @	2.00
Quaker	ton		
Superfine	ton	10.00 @	12.00
Sussex	ton		
Witco	ton	20.00 @	—
Zinc Carbonate	lb.	.09½@	.10¼
Zinc Stearate	lb.	.23 @	.24½

MINERAL RUBBER

Genasco (factory)	ton	50.00 @	52.00
Granulated M. R.	ton		
Hard Hydrocarbon	ton		
Paradura	ton	62.50 @	65.00
Pioneer, MR, solid	ton	40.00 @	42.00
Pioneer-granulated	ton	50.00 @	52.00
R & H Hydro-Carbon	ton	27.05 @	29.00
Robertson, MR, solid	ton	34.00 @	80.00
M.R. (gran)	ton	38.00 @	80.00

SOFTENERS

Acids

Nitric, 36 degrees	cwt.	5.00 @	5.25
Sulfuric, 66°	cwt.	1.60 @	1.95
Tartaric, crystals	lb.	.38 @	.38½

Acids, Fatty

Laurex	lb.	.15 @	.16
Stearex	lb.	.18 @	.19
Stearic, double pressed	lb.	.17 @	.22

Alkalies

Caustic soda, 76%	cwt.	3.76 @	3.91
Soda ash, 58% C.L.	cwt.	1.40 @	

Oils

Corn, refined, bbls.	lb.	.10 @	.10¼
Cottonseed, crude		— @	.07¼
Cycline	gal.	.27 @	.34
Degras (c.l. 100 bbls.)	lb.	.03¾@	—
Less c. l. (10-25 bbls.)	lb.	.04 @	—
Lots less than 10 bbls.	lb.	.04¼@	.04½
Fluxrite	lb.	.05½@	.06½
Palm Lagos	lb.	.07⅜@	.07½
Niger	lb.	— @	.07¼
Para-Flux	gal.	.17 @	—
Petrolatum, white	lb.	.08 @	.08½
Pigmentaroil	gal.	.21 @	.36
Pine, steam distilled	gal.	.65 @	.70
destructively distilled	gal.	.55 @	.58
Witco Palm Oil	lb.	.11 @	—
Witco Softener (f.o.b. wks.)	lb.	.02 @	—

Resins and Pitches

Pitch, Burgundy	lb.	.06½@	.07½
coal tar	gal.	.05½@	.06
pine, 200 lb. gr. wt.	bbl.	9.00 @	10.00
Rosin, grade K, 280 lb.	bbl.	— @	6.65
Pigmentar	lb.	.038 @	.0446
Tar Retort, 50 gal.	bbl.	13.50 @	15.00

Solvents

Acetone, pure	lb.	.11 @	.12
Alcohol denatured, No. 1 bbls.	gal.	.43 @	.45
Benzol, 90%	gal.	.21 @	.23
Carbon bisulphide	lb.	.05½@	.06¼
Carbon tetrachloride	lb.	.06¼@	.07
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.35 @	.40
Rub-Sol (f.o.b .Okla.)	gal.	.09 @	—
Turpentine, spirits	gal.	.48 @	.54
wood	gal.	— @	.45
destructively distilled	gal.	.40 @	.48

Waxes

Beeswax, white	lb.	.51 @	.53
Carnauba	lb.	— @	.34
Ceresin, white	lb.	.10 @	.11
Montan, crude	lb.	.06½@	.07
Ozokerite, black	lb.	.24 @	.25
green	lb.	.26 @	.30

Paraffin (c. l.—f.o.b. N. Y.)

Yellow crude scale	lb.	.03⅛@	—
White crude scale 124/126	lb.	.03⅛@	—
Refined, 125/127	lb.	.04¼@	—
Refined, 128/130	lb.	.04½@	—
Refined, 135/137	lb.	.05¾@	—
Refined, 138/140	lb.	.07¾@	—

ANTI-OXIDANTS

Agerite, Resin	lb.		
Powder	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Neozone	lb.		
Oxynone	lb.	.68 @	.80
Resistox	lb.	.54 @	.57
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.66

SPECIALTIES

Sunproof	lb.	.35 @	.37½
Tonox	lb.	.56 @	.60

SUBSTITUTES

Black	lb.	.08 @	.14
White	lb.	.10 @	.16
Brown	lb.	.08 @	.15

VULCANIZING INGREDIENTS

Sulfur Chloride (drums)	lb.	.03½@	.04⅛
Sulfur flour, Ref'n'd, 100% pure (bags)	cwt.	2.40 @	2.75
Commercial (bags)	cwt.	1.75 @	2.10
Vandex	lb.		

TIRES & TUBES
CRUDE RUBBER

STATISTICAL SECTION

AUTOMOBILES
GASOLINE

WHILE it is still impossible to determine the exact effect of the May tapping vacation in the Far East, it can hardly have approached the results that its backers expected. Despite this apparently desperate step on the part of the rubber growing interests, the crude commodity has declined to the lowest price levels in nine years and stocks show no signs of diminishing.

While the amount of crude rubber on hand in the United States dropped from 148,272 long tons to 146,179 long tons, the quantity afloat to this country increased from 63,261 long tons on April 30 to 68,168 long tons on May 31. Warehouse stocks at London and Liverpool, meanwhile, have jumped to 104,750 long tons as of June 14 from 102,724 long tons as of May 31.

Total stocks in the Penang and Singapore district show a slight decline, but the figure that is more eagerly awaited is the inventory for the estates of the Malaya mainland on May 31. On April 30, this figure stood at 39,758 long tons, and, if the month's tapping vacation has had any effect whatever, there should be a marked decline in this total.

Latest figures covering imports and exports from the leadinf producing and consuming countries have been added to the appropriate tables in this section.

PLAN OF THE SECTION

The statistics included in this section have been chosen for their constant importance to the rubber industry. The tables are reprinted in the same relative position in every issue, each table being kept current by the addition of new figures as soon as they become available.

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U. S. Imports and Exports of Crude Rubber

	Gross Imports			Re-exports			Net Imports
YEARS	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons
1921	185,394	73,772,677	17.76	5,716	2,414,924	16.86	179,678
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,804	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,758	59.76	381,815
1926	413,838	505,817,807	54.63	17,671	22,470,583	56.77	396,667
1927	426,258	339,874,774	35.60	27,775	24,715,488	39.76	398,483
1928	489,781	244,854,978	25.08	22,159	13,128,361	25.17	467,572
1929	560,084	239,178,783	19.15	36,485	16,868,783	20.64	523,599
1927:							
July	37,677	21,678,259	37.53	1,958	1,560,853	35.59	35,719
Aug.	32,810	26,396,931	35.92	1,809	1,382,768	34.12	31,001
Sept.	33,301	25,314,412	33.94	3,500	3,036,929	38.74	29,801
Oct.	30,184	22,163,282	32.78	2,513	2,042,713	36.29	27,671
Nov.	28,592	27,395,428	31.69	2,469	2,014,196	36.43	26,123
Dec.	30,787	22,213,574	32.26	2,655	2,245,754	37.77	28,082
1928:							
Jan.	39,187	30,278,444	34.56	1,988	1,734,990	38.95	37,119
Feb.	33,663	27,763,655	36.82	2,738	2,229,589	36.35	30,925
Mar.	40,611	32,103,042	35.29	3,718	2,587,435	31.07	36,893
Apr.	37,935	27,287,266	32.11	2,272	1,415,024	27.80	35,663
May	31,059	19,058,672	27.39	2,399	1,336,307	25.80	28,660
June	27,765	14,121,219	22.71	2,621	1,400,697	23.86	25,144
July	31,258	14,144,765	20.20	3,087	1,451,446	20.99	28,171
Aug.	31,204	12,860,150	18.39	2,377	1,034,646	20.37	28,827
Sept.	39,235	16,512,019	18.50	3,038	1,334,148	20.34	36,797
Oct.	44,958	18,200,332	18.44	3,405	1,085,467	20.15	41,653
Nov.	36,519	14,878,441	18.19	2,788	1,207,089	18.52	33,731
Dec.	43,511	17,580,966	18.04	2,733	1,165,743	19.00	40,778
1929:							
Jan.	57,564	22,872,943	17.74	3,663	1,773,461	21.61	53,901
Feb.	64,265	24,760,111	17.20	2,955	1,374,783	20.77	61,310
Mar.	80,604	29,880,905	17.98	4,218	2,094,037	22.16	46,386
Apr.	55,725	25,542,726	20.46	3,293	1,624,237	22.01	52,432
May	51,161	24,355,511	21.25	2,336	1,349,690	21.24	48,825
June	41,663	18,799,307	20.14	3,152	1,470,746	20.83	38,511
July	43,944	19,342,147	19.65	3,424	1,590,411	20.73	40,520
Aug.	37,222	16,530,090	19.83	2,644	1,232,217	20.80	34,578
Sept.	34,472	15,214,485	19.70	2,011	861,068	19.11	32,461
Oct.	38,163	16,192,261	18.94	2,614	1,190,510	20.33	35,549
Nov.	43,507	18,189,305	18.66	2,929	1,300,354	19.82	40,578
Dec.	42,952	17,573,330	18.27	2,745	1,007,279	16.38	40,207
1930:							
Jan.	47,496	17,793,563	16.72	3,144	1,077,415	15.30	44,352
Feb.	42,687	14,798,240	15.48	2,280	960,790	18.80	40,407
Mar.	44,976	14,653,243	14.54	3,187	1,192,708	16.71	41,789
Apr.	45,423	14,783,605	14.53	2,688	892,532	14.82	42,735
May							
June							

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1923	1924	1925	1926	1927	1928	1929	1930
Jan.	30,106	29,058	29,638	32,196	31,518	34,403	43,002	36,669
Feb.	30,149	25,736	29,761	31,136	30,137	33,702	41,594	32,726
Mar.	36,629	28,385	33,498	32,936	36,141	35,688	44,730	35,914
Apr.	29,085	27,129	34,189	32,696	35,871	32,772	47,521	40,207
May	36,155	25,845	35,322	29,364	34,592	37,333	49,233	39,902
June	24,272	22,753	35,822	28,598	33,801	37,676	43,227	
July	17,685	23,396	36,053	27,577	29,219	37,407	41,526	
Aug.	20,359	28,982	35,909	34,533	33,460	42,927	38,274	
Sept.	17,594	31,497	31,691	32,904	27,214	39,882	34,707	
Oct.	21,321	31,520	29,047	29,836	26,790	40,857	34,800	
Nov.	20,437	27,289	28,853	28,080	26,792	37,461	27,659	
Dec.	31,902	27,199	28,748	26,293	25,492	31,232	23,531	
Totals	305,694	328,769	388,481	366,149	371,027	441,340	469,804	

Figures on Quarterly Basis

Quarter	1923	1924	1925	1926	1927	1928	1929	1930
Jan./Mar.	96,776	87,609	95,263	94,301	99,216	103,558	128,565	101,610
Apr./June	89,493	75,674	104,099	87,109	103,242	103,500	139,292	
July/Sept.	55,621	83,813	99,493	93,793	89,210	117,573	113,746	
Oct./Dec.	63,617	92,656	85,789	83,212	80,860	117,597	84,872	
Totals	305,507	339,752	384,644	358,415	372,528	442,227	466,475	

Note—The Rubber Association estimates its monthly rubber consumption figures to be 90 per cent complete. Up until 1925 the quarterly figures were likewise estimated to be 90 per cent complete; beginning with 1925 an estimate of 92 per cent completeness has been used. These estimates have been used in raising the figures in this table to 100 per cent. The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Rubber Invoiced to the U. S.

(Reported by American Consuls—Quantities in Long Tons)

During the Week Ended	From Br. Malaya	From Ceylon	From Dutch East Indies	From London & Liverpool	Total
Mar. 29	5,867	1,335	1,462	—	8,664
Apr. 5	7,435	779	2,109	—	10,323
Apr. 12	7,026	1,235	1,527	7	9,795
Apr. 19	6,013	493	1,109	21	7,636
Apr. 26	5,558	642	1,224	—	7,424
May 3	7,703	1,384	1,806	25	10,918
May 10	6,863	891	1,271	11	9,036
May 17	8,359	650	1,874	30	10,913
May 24	6,041	741	1,500	162	8,444
May 31	6,532	738	1,746	54	9,070
June 7	6,443	1,020	1,971	24	9,458
June 14	5,938	631	1,586	63	8,218

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1928																																
February	87½	87¾	87¾	87¾	—	86¾	87	86¾	84½	83¾	83¾	—	—	82½	82½	81¼	81¼	81¼	—	80¾	28¾	—	28½	—	28½	—	29	28¾	29¼	21¾	22¼	82¾
March	29	28¾	28¾	29	—	28¾	26¾	26¾	25¾	25¼	—	24¾	24¾	25½	25	—	25¼	25¼	28¾	26¼	26	26¾	27½	27½	—	26¾	27¼	27¾	27¾	27¾	—	26¾
April	—	27¼	27¼	21½	21¼	—	—	20	18¾	18¾	18¾	18½	18¾	18¾	18¾	17½	17¾	17½	17¾	—	17¾	18¾	17	17	17¾	17¾	17¾	17¾	—	17¾	19	—
May	17¼	17¾	18¼	19¼	19¼	—	18¾	19¼	19¼	18¾	18¾	19¼	19¼	19¼	19¼	18¾	18¾	18¾	19¼	19¾	19¾	18¾	19	19¾	19¾	19¾	20¼	20	20	—	19¾	19
June	19¼	19¾	—	19¾	19¾	—	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19	—	19¾	19½
July	19¾	18¾	18¾	—	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19	19¾	19¾	19¾
August	19½	19½	19¾	19¾	—	19¾	19¾	20	20	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½	—	18½
September	—	—	19¾	19¾	19¾	—	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½	18½
October	18¾	18½	18¾	18¾	18¾	—	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	18¼
November	17¾	—	17¾	17¾	17¾	18¼	18	18	—	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	17¾	17¾	17¾	18¼	18¼	18¼	18¼	18
December																																
1929																																
January	—	18¼	18¼	18¼	18¼	—	18¾	18¾	18¾	18%	20	20	—	20	19¾	20¾	20¾	20¼	20¼	20¼	20%	20¾	20¾	20¾	21¾	21¾	21¾	21¾	21¾	21¾	22¼	20¼
February	22¾	22	—	21¾	22¼	22¼	22¼	22¼	22¼	—	25¾	25¾	23	23	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	25¾	26¼	26¼	26¼	—	—	24
March	26	26	—	26	26	22½	25¾	25¾	25½	22¾	25¾	25¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	—	—	24½
April	23	23¼	22¼	22¾	22¾	22½	22¾	22¾	22¾	22¾	22¾	21¾	21¾	21¾	21¾	22¾	21¾	21¾	20	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	—	21½
May	19¾	19¾	19¾	19¾	19¾	20¾	21¾	21½	21	22¾	22¾	22¾	22¾	22¾	22¾	22¾	22¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	21¾	21¾	21½
June	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	22½	21	20¾	20½	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	21¾	21¾	20¾
July	20¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	22	20¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾
Aug.	21¾	21	—	21	21	21	21	21	21	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾
Sept.	—	—	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾
Oct.	19¾	19½	19¾	19¾	19¾	19¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾
Nov.	17¾	17½	—	17¾	17¾	—	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾	17¾
Dec.	—	16¾	16¼	16¼	16¼	—	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¼
1930																																
January	—	15¾	—	15¾	15¾	—	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾
February	15¾	—	15¾	15¾	15	15	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾
March	15¾	15¾	—	15¾	15	15	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾	15¾
April	15¾	—	15¾	15¾	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼
May	14¾	14¾	14¾	14¾	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼	14¼
June	—	13¾	13¾	13¾	13¾	13¾	13¾	13¾	—	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾	13¾

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1921

Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15
1911	141.36	1915	65.85	1919	48.70
1912	121.60	1916	72.50	1920	36.20
1913	82.04	1917	72.23	1921	16.36

Average Monthly Price per Pound Since 1922

Months	1922 Cents	1923 Cents	1924 Cents	1925 Cents	1926 Cents	1927 Cents	1928 Cents	1929 Cents	1930 Cents
Jan.	18.82	32.73	25.86	36.71	79.50	38.75	40.25	20.14	15.24
Feb.	16.12	35.14	25.29	36.01	62.25	38.25	32.75	23.97	15.85
Mar.	14.53	34.21	22.83	41.00	59.00	41.04	26.82	24.55	15.34
Apr.	15.99	32.48	22.51	43.64	51.25	40.86	18.97	21.18	14.98
May	15.25	27.39	18.89	58.47	47.75	40.76	18.99	21.46	14.24
June	15.11	26.88	18.81	77.26	42.50	37.25	19.59	20.64	—
July	14.67	26.10	22.16	103.16	41.03	34.87	19.40	21.30	—
Aug.	13.93	28.84	26.17	82.99	38.50	35.12	19.46	20.59	—
Sept.	14.44	28.95	27.56	88.88	41.00	33.67	18.47	20.37	—
Oct.	19.78	26.93	31.13	98.01	42.50	34.32	18.83	19.67	—
Nov.	23.38	27.14	34.33	104.80	38.50	37.58	18.26	16.62	—
Dec.	27.42	26.60	37.88	98.51	38.25	40.63	17.97	16.12	—
Average for Year	17.50	29.45	26.20	72.46	46.50	37.72	22.48	20.55	—

London Closing Prices of Ribbed Smoked Sheet

(In Pence Per Pound)

Day	Mar.	Apr.	May	June	Day	Mar.	Apr.	May	June
1	7⅞	7⅝	7	—	17	7½	7½	6⅞	6⅛
2	—	7⅝	7	6⅝	18	7½	—	—	6
3	7⅞	7⅝	7	6⅝	19	7½	—	6¾	—
4	7¾	7½	—	6⅝	20	7⅝	—	6⅞	—
5	7⅝	7½	6⅞	6⅝	21	7⅝	—	6⅞	—
6	7½	—	6⅞	6⅝	22	7⅝	7⅝	6⅞	—
7	7½	7½	6⅞	—	23	—	7⅝	6⅞	—
8	7⅝	7½	7	—	24	7⅝	7¼	7	—
9	—	7½	7⅛	—	25	7¾	7⅛	—	—
10	7⅝	7½	7⅛	6⅛	26	7⅝	—	7	—
11	7½	7½	—	6⅛	27	7⅝	—	6⅞	—
12	7½	7½	7	6⅛	28	7¾	7	6⅞	—
13	7½	—	7	6¼	29	7¾	7	6⅞	—
14	7⅛	7½	7	6⅛	30	—	7	6⅝	—
15	7⅝	7½	6⅞	—	31	7⅝	—	6¾	—
16	—	7½	6⅞	6⅛					

Average Monthly Price Per Pound

Month	1928 Pence	1929 Pence	1930 Pence	Month	1928 Pence	1929 Pence	1930 Pence
Jan.	19.310	9.942	7.471	Aug.	9.300	10.505	—
Feb.	15.713	11.875	7.948	Sept.	8.530	10.160	—
Mar.	12.736	12.135	7.595	Oct.	8.807	9.620	—
Apr.	8.864	10.490	7.391	Nov.	8.596	8.442	—
May	8.845	10.717	6.926	Dec.	8.570	7.958	—
June	9.293	10.580	—	Average			
July	9.312	11.065	—	for Year	10.656	10.291	—

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Day of Month	May	June	Day of Month	May	June	Day of Month	May	June
1	16.70	—	11	—	15.10	21	16.50	—
2	16.60	16.15	12	16.30	14.80	22	16.45	—
3	16.40	16.00	13	16.55	14.50	23	16.40	—
4	—	15.90	14	16.35	13.95	24	16.30	—
5	16.55	16.00	15	16.35	—	25	—	—
6	16.55	15.85	16	16.50	13.45	26	16.20	—
7	16.45	15.70	17	16.50	13.55	27	16.20	—
8	16.60	—	18	—	13.70	28	16.20	—
9	16.55	15.70	19	16.30	—	29	16.30	—
10	16.55	15.25	20	16.40	—	30	—	—
						31	—	—

Average Monthly Price Per Pound

Month	1928 Cents	1929 Cents	1930 Cents	Month	1928 Cents	1929 Cents	1930 Cents
Jan.	19.12	20.22	17.21	Aug.	19.28	18.62	—
Feb.	18.40	20.21	15.62	Sept.	18.67	18.83	—
Mar.	19.38	20.19	15.13	Oct.	19.62	18.46	—
Apr.	20.63	20.29	16.39	Nov.	19.84	17.52	—
May	21.58	19.41	16.43	Dec.	20.22	17.28	—
June	21.50	18.74	—	Average			
July	21.36	18.62	—	for Year	19.97	19.03	—

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND			AFLOAT			ON HAND AND AFLOAT		
	1928	1929	1930	1928	1929	1930	1928	1929	1930
Jan.	110,244	76,342	126,068	46,441	93,330	65,483	156,685	169,672	191,551
Feb.	108,955	90,058	134,790	48,044	75,790	71,015	156,999	165,848	205,805
Mar.	114,061	100,536	141,843	43,375	76,648	63,646	157,439	177,184	205,489
Apr.	113,083	107,659	148,272	32,783	66,919	63,261	145,866	174,578	211,533
May	105,356	97,192	146,179	33,145	60,326	68,168	138,501	157,518	214,347
June	90,198	92,061		38,392	58,748		128,590	150,809	
July	83,242	92,535		42,943	52,793		126,185	145,328	
Aug.	68,994	90,769		54,904	48,434		123,898	139,203	
Sept.	68,851	84,362		52,692	58,954		121,543	143,316	
Oct.	66,421	88,483		45,646	61,140		112,067	149,623	
Nov.	61,956	92,219		75,502	62,268		137,458	154,487	
Dec.	66,166	118,609		92,037	67,009		158,203	185,618	

(Rubber Manufacturers' Association figures raised to 100%.)

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1928	1929	1930	At end of	1928	1929	1930
Jan.	66,524	25,191	60,434	July	35,429	30,080	
Feb.	62,964	25,554	64,557	Aug.	32,084	35,605	
Mar.	58,272	28,214		Sept.	31,440	42,188	
Apr.	53,425	31,368		Oct.	24,207	47,803	
May	44,628	31,290		Nov.	17,775	52,454	
June	38,756	31,025		Dec.	19,815	54,304	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1930					
January	56,616	58,990	59,607	59,984	
February	60,460	61,482	62,659	62,725	
March	64,383	66,418	66,885	68,404	69,233
April	71,477	72,333	73,252	74,084	
May	75,540	76,118	76,932	76,953	77,198
June	77,616	78,104			

Stocks in Liverpool

1930					
January	19,438	19,640	19,515	20,063	——
February	19,898	19,761	19,677	19,704	
March	20,693	20,727	20,849	21,187	21,198
April	22,008	22,676	22,663	23,546	
May	23,877	23,755	24,448	24,722	25,526
June	25,320	26,646			

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1928	1929	1930	End of	1928	1929	1930
Jan.	25,868	29,617	39,727	July	18,663	33,859	——
Feb.	22,867	32,373	44,371	Aug.	18,971	30,834	——
Mar.	20,538	29,437	45,657	Sept.	14,898	32,138	——
Apr.	16,946	26,474	43,473	Oct.	12,149	33,770	——
May	17,437	30,764	44,715	Nov.	29,188	30,963	——
June	18,207	30,405	——	Dec.	32,895	35,548	——

STOCKS IN OTHER CENTRES

1930 End of	Malaya Mainland	Afloat for Europe[1]	Holland	Colombo	Para and Manaos
Jan.	44,473	28,440	2,134	5,400	3,678
Feb.	41,111	28,180	2,159	5,000	4,370
Mar.	39,226	27,510	2,220	4,759	3,839
Apr.	39,758	23,380			4,382
May					
June					

(1) Reported by U. S. Department of Commerce.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total	Per Cent Balloons		Total	Per Cent Balloons
1922	16,297,735	0.0	1926	24,199,524	78.8
1923	23,140,620	0.6	1927	19,700,003	79.1
1924	21,863,311	19.7	1928	24,247,282	81.6
1925	26,001,664	66.8	1929	24,141,502	80.3
1929			1930		
July	1,896,666	78.2	January	1,601,326	84.0
August	1,570,099	79.4	February	1,653,421	78.9
September	2,110,003	80.7	March	2,061,999	79.1
October	1,647,350	76.4	April	2,339,834	81.1
November	596,989	84.7	May	2,010,067	84.3
December	879,259	79.0	June		

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1922	1923	1924	1925	1926	1927	1928	1929
Production	40,932	45,259	51,633	60,845	61,237	64,439	77,944	73,308
Shipments	39,987	45,204	50,120	59,262	59,002	64,059	74,296	74,021
Inventory[2]	6,132	5,772	7,427	8,142	10,456	10,264	13,624	12,627

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1928	1929	1930	1928	1929	1930	1928	1929	1930
Jan.	5,358	6,722	4,745	5,394	6,626	4,701	9,949	13,712	12,719
Feb.	6,363	6,912	4,859	5,031	5,282	4,474	11,721	15,495	13,238
Mar.	6,819	7,519	5,188	5,731	6,708	5,032	12,389	16,351	13,469
Apr.	6,178	7,384	6,024	5,812	7,294	5,429	12,717	16,929	13,948
May	6,759	8,145	——	6,457	7,184	——	13,024	17,849	——
June	6,692	7,304	——	7,117	7,254	——	12,162	17,957	——
July	6,498	6,475	——	7,895	7,855	——	11,157	15,830	——
Aug.	7,469	5,806	——	8,403	7,845	——	10,034	14,226	——
Sept.	6,802	4,758	——	7,145	5,998	——	9,765	12,875	——
Oct.	7,326	4,919	——	5,717	4,960	——	11,520	12,845	——
Nov.	6,075	3,603	——	4,998	3,558	——	12,579	12,935	——
Dec.	5,605	3,261	——	4,591	3,346	——	13,624	12,627	——

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1922	1923	1924	1925	1926	1927	1928	1929
Production	50,850	60,116	70,706	82,614	76,618	70,823	80,180	73,417
Shipments	49,678	59,072	68,016	81,004	71,591	72,896	77,127	75,298
Inventory[2]	7,643	8,425	11,052	11,313	16,200	13,692	16,117	13,660

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1928	1929	1930	1928	1929	1930	1928	1929	1930
Jan.	5,441	6,517	4,914	6,072	7,242	5,181	12,982	13,386	13,551
Feb.	6,895	6,769	4,943	5,431	5,278	4,627	14,650	16,999	13,905
Mar.	6,231	7,466	5,271	5,731	6,737	5,042	15,573	17,750	14,057
Apr.	6,661	7,634	5,877	5,702	7,164	5,172	16,638	18,134	14,704
May	7,168	7,660	——	6,300	7,038	——	17,702	18,928	——
June	6,953	6,978	——	7,136	6,950	——	17,159	17,741	——
July	6,674	6,178	——	8,729	8,113	——	14,974	16,332	——
Aug.	8,343	5,846	——	9,350	8,183	——	13,931	14,157	——
Sept.	7,103	5,536	——	7,154	6,250	——	13,543	13,424	——
Oct.	6,929	5,310	——	5,662	5,001	——	15,285	13,656	——
Nov.	5,592	3,780	——	5,002	3,712	——	15,743	13,701	——
Dec.	5,184	3,716	——	4,858	3,681	——	16,117	13,660	——

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% representative or complete when issued and that basis has been accepted when preparing the statistics in this table.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States			Canada			
	Total	Passenger Cars	Trucks	Total	Passenger Cars	Trucks	Grand Total
1923	4,020,255	3,631,728	388,527	146,438	129,228	17,210	4,166,693
1924	3,600,918	3,203,049	397,869	135,246	117,765	17,481	3,736,164
1925	4,265,704	3,760,459	505,245	161,389	139,311	22,078	4,427,093
1926	4,298,799	3,808,753	490,046	205,092	164,483	40,609	4,503,891
1927	3,393,887	2,938,868	453,019	179,426	146,870	32,556	3,573,313
1928							
July	390,445	237,933	52,512	25,226	20,122	5,104	415,671
Aug.	458,429	400,689	57,740	31,245	24,274	6,971	489,674
Sept.	413,722	358,872	54,850	21,193	16,572	4,621	434,915
Oct.	397,094	339,976	57,120	18,536	13,016	5,520	415,632
Nov.	256,936	217,256	39,680	11,769	8,154	3,615	268,705
Dec.	233,135	205,144	27,991	9,425	6,734	2,691	242,560
TOTAL	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929							
Jan.	402,154	350,617	51,537	21,501	17,164	4,337	423,655
Feb.	466,084	407,589	58,495	31,287	25,584	5,703	497,371
March	584,733	513,266	69,559	40,621	32,833	7,788	625,354
April	620,656	538,679	81,977	41,901	34,392	7,509	662,557
May	603,969	516,055	86,596	31,559	25,129	6,430	635,528
June	545,252	453,956	91,296	21,492	16,511	4,981	566,744
July	500,331	427,213	73,118	17,461	13,600	3,861	517,792
Aug.	499,629	444,711	54,918	14,214	11,037	3,177	513,843
Sept.	415,332	365,651	49,681	13,817	10,710	3,107	429,149
Oct.	380,011	321,195	58,816	14,523	8,975	5,548	394,534
Nov.	217,570	170,928	46,642	9,424	7,137	2,287	226,994
Dec.	119,950	92,717	27,233	5,495	4,426	1,069	125,445
TOTAL	5,358,361	4,603,609	754,752	263,295	207,498	55,797	5,621,656
1930							
Jan.	273,089	235,099	37,990	10,388	8,856	1,532	283,477
Feb.	323,962	276,833	47,129	15,548	13,021	2,527	339,510
March	401,378	336,178	64,200	20,730	17,165	3,565	422,108
April	442,630	375,171	67,459	24,257	20,872	3,385	466,887
May							
June							

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA								DUTCH EAST INDIES[1]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon[2]	India & Burma[3]	Sarawak[4]	British North Borneo[5]	Siam[6]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China[7]	Amazon Valley	All Other[8]	World Total
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,958
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,368
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,877	46,757	65,499	120,626	7,881	25,298	13,797	517,529
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1928:															
Apr.	20,139	9,335	10,804	3,233	789	630	494	258	3,995	5,040	5,499	736	1,014	1,323	33,810
May	26,483	10,350	16,133	3,091	654	842	494	241	4,943	5,855	10,347	717	2,602	1,135	45,994
June	22,994	16,168	6,826	3,107	963	926	494	451	5,419	5,863	13,655	725	1,399	960	40,788
July	30,481	13,383	17,098	5,129	1,043	905	593	366	5,602	7,566	11,594	698	1,264	878	52,781
Aug.	35,674	15,114	20,560	5,720	398	1,227	593	544	5,668	7,438	11,893	712	1,732	450	56,936
Sept.	29,769	11,289	18,480	4,675	457	938	594	447	4,956	6,536	9,863	969	1,614	494	50,073
Oct.	24,476	12,603	11,873	3,999	864	949	564	457	5,295	7,474	10,124	518	1,399	732	44,249
Nov.	68,135	10,436	57,699	8,005	1,048	772	564	425	4,950	7,902	7,805	943	1,790	623	92,526
Dec.	66,763	11,122	55,641	7,848	1,113	744	665	294	5,120	8,792	10,896	948	2,220	588	94,769
1929:															
Jan.	52,546	13,415	39,131	8,301	1,664	873	600	461	5,640	8,067	11,076	850	2,134	643	79,439
Feb.	47,926	12,103	35,823	7,064	1,117	965	600	495	6,572	7,511	10,384	807	2,104	520	73,982
Mar.	49,448	14,553	34,895	6,583	1,413	758	601	499	5,515	6,620	10,629	658	2,332	786	71,289
Apr.	49,816	11,414	38,402	5,097	727	747	548	306	5,997	6,645	11,321	673	1,950	569	72,982
May	43,960	15,593	28,367	5,723	800	966	548	453	6,264	6,961	13,437	1,059	1,922	733	67,233
June	40,398	14,344	26,054	5,563	1,122	1,061	547	422	5,582	6,693	11,270	757	1,398	548	61,017
July	46,454	15,071	31,383	5,457	974	1,247	641	462	6,422	7,192	13,995	575	1,457	543	70,348
Aug.	50,441	15,469	34,972	6,079	685	995	641	431	4,644	7,298	10,782	1,032	1,563	499	69,619
Sept.	53,484	12,392	41,092	7,993	384	832	640	406	4,708	7,517	10,149	655	1,566	504	76,446
Oct.	47,937	12,516	35,421	8,381	812	1,047	671	485	4,697	8,295	10,512	893	1,606	445	73,265
Nov.	46,279	11,204	35,075	6,660	1,065	668	672	278	4,760	6,711	9,380	771	1,442	585	68,017
Dec.	46,147	15,018	31,129	8,683	900	930	672	320	5,189	8,279	11,102	966	1,674	443	70,287
1930:															
Jan.	52,535	11,773	40,762	7,741	1,560	791	600*	386	5,709	7,831	8,920	856	1,837	400*	77,393*
Feb.	48,947	12,960	35,987	7,825	1,245	847	600*	469	6,900	7,191	11,414	944	1,797	400*	75,619*
Mar.	47,320	13,236	34,084	6,269	1,129	976	600*	391	5,796	6,612	11,070	643	1,674	400*	
Apr.	45,517	16,331	29,186	5,030					4,802	6,326	12,582	433	1,201		
May	49,388	36,135	13,253												

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927 and 1,437 in 1928. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included— such shipments were equivalent to 18 tons in 1923, 93 tons 1924, 6 tons 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons 1924, 2,239 tons 1925, 44 tons in 1926, 84 tons in 1927, and 1,489 tons in 1928. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands. This figure includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. *Figure is provisional; final figure will be shown immediately it becomes available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States[1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (ed)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	236,977	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	342,878
1920	248,762	56,844	13,885	11,890	11,746	5,297	6,128	62	1,815	3,840	5,510	2,292	2,008	567	370,641
1921	179,678	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	589	300,562
1922	296,267	11,724	24,352	27,546	9,207	15,984	6,430	2,493	2,643	172	3,807	1,778	589	567	395,888
1923	300,372	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	408,018
1924	317,747	11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	807	3,178	944	1,370	414,847
1925	381,815	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	516,493
1926	395,667	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,492	2,670	4,046	1,299	1,870	613,647
1927	398,483	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	627,789
1928	404,496	4,846	36,498	37,855	30,447	25,621	12,483	15,134	8,430	7,958	2,243	4,418	3,178	3,135	596,696
1929	526,709	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	892,739
1928:															
Mar.	36,893	3,179	1,902	3,521	2,989	1,694	763	231	918	816	95	351	497	298	54,247
April	35,663	—2,280	2,204	2,719	1,938	2,334	1,114	1,820	832	575	280	339	304	159	48,001
May	28,660	—5,322	3,297	2,944	2,180	2,288	1,090	3,893	655	746	209	485	220	213	41,558
June	25,143	—3,031	3,597	2,968	2,186	2,102	984	4,111	348	743	133	346	251	182	40,068
July	28,170	—1,374	3,518	3,387	2,692	2,026	1,598	724	591	895	395	294	175	384	43,475
Aug.	28,827	48	3,527	2,744	2,447	1,868	875	632	707	519	316	359	58	94	43,021
Sept.	36,800	4,199	3,524	3,553	2,812	1,837	1,278	20	603	597	345	377	277	235	56,457
Oct.	41,667	—934	3,728	4,386	2,943	3,711	1,049	98	766	696	141	527	250	318	59,346
Nov.	33,846	—3,141	3,278	3,694	2,799	2,150	1,340	689	837	544	31	337	252	282	46,988
Dec.	40,781	8,438	3,633	2,470	2,618	3,002	1,145	1,378	755	639	148	435	263	200	65,905
1929:															
Jan.	53,922	11,951	5,645	4,711	3,759	3,776	1,481	956	1,061	749	218	638	179	525	89,571
Feb.	61,331	5,179	5,001	4,618	2,906	2,727	1,259	684	1,131	627	113	226	115	356	86,270
Mar.	46,391	9,068	4,409	4,586	4,961	2,630	1,515	716	725	931	316	354	80	409	77,091
Apr.	52,447	8,295	4,854	5,351	3,177	2,308	1,407	703	1,518	750	144	956	40	445	82,395
May	48,350	5,112	3,152	3,682	2,937	2,314	1,417	996	1,437	854	201	468	37	277	71,234
June	38,676	4,787	6,814	3,948	3,075	1,593	1,624	695	2,215	672	687	507	24	420	65,787
July	40,914	4,993	4,839	3,559	3,205	2,388	2,023	1,056	2,918	1,039	253	519	30	465	68,201
Aug.	35,207	14,594	4,645	4,082	2,879	3,663	908	1,234	724	902	254	429	25	319	69,865
Sept.	32,171	17,010	3,889	4,691	1,908	3,511	1,224	1,235	853	672	253	361	91	477	68,346
Oct.	35,840	16,111	4,489	3,355	1,821	3,902	1,538	1,073	1,125	1,147	278	710	91	201	71,981
Nov.	40,972	13,141	3,082	3,776	2,709	3,221	1,275	1,226	1,453	361	253	595	62	313	72,439
Dec.	40,488	12,434	4,274	2,921	2,114	2,251	1,198	1,200	726	741	52	677	90	443	69,609*
1930:															
Jan.	44,759	11,106	4,207	3,862	2,842	2,805	910	1,000*	332	612	209	552		577	
Feb.	40,718	10,293	4,482	3,697	2,250	1,386	1,385		457	1,143	188	315		239	
Mar.	42,068	12,346	4,354	4,289	3,776	2,485	1,083		975	678	358				
Apr.	42,961	13,058		4,486	2,303		2,067								

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]United States imports of guayule are not included in this compilation; such imports amounted to 4,805 tons in 1926; to 5,010 tons in 1927; to 3,076 in 1928; and to 1,231 tons in 1929. *Figure is provisional; final figure will be shown immediately it becomes available.

Domestic Production of Miscellaneous Rubber Goods

	Rubber Proofed Fabrics Yards	Rubber Heels Pairs	Rubber Soles Pairs	Mechanical Goods Shipments Dollars
1924	25,020,000	186,279,000	(1)	$48,615,000
1925	22,988,000	206,970,000	16,211,620(2)	64,877,000
1926	29,328,000	183,312,000	12,258,000	76,789,000
1927	37,872,000	201,014,000	27,160,000	62,625,000
1928	41,179,000	235,170,000	37,645,000	69,114,000
1929	50,731,000	232,126,000	34,499,000	74,770,000
1929:				
April	4,000,000	17,256,000	2,601,000	7,035,000
May	4,860,000	19,541,000	2,916,000	7,189,000
June	4,409,000	20,007,000	2,502,000	6,792,000
July	4,260,000	19,315,000	1,295,000	6,306,000
August	5,085,000	23,095,000	2,948,000	6,792,000
September	5,507,000	21,702,000	2,841,000	5,906,000
October	6,116,000	22,386,000	3,502,000	5,887,000
November	4,395,000	17,863,000	3,400,000	4,932,000
December	2,291,000	14,781,000	3,003,000	4,751,000
1930:				
January	3,281,000	15,470,000	3,496,000	5,169,000
February	3,441,000	14,172,000	2,338,000	5,376,000

(1) Not available; (2) Last 9 months only.
Source: "Survey of Current of Business of the Department of Commerce."

United States Imports of Guayule Rubber and Related Gums

(All quantities in Long Tons)

	Guayule		Balata		Jelutong		Gutta Percha	
	Tons	Dollars	Tons	Dollars	Tons	Dollars	Tons	Dollars
1919	1,430	760,690	727	937,038	8,332	2,213,964	2,900	1,068,698
1920	758	345,985	1,064	1,260,043	5,672	2,068,501	3,183	1,520,309
1921	58	26,945	814	1,077,859	1,745	351,893	985	333,564
1922	127	57,040	812	978,765	2,335	403,812	818	281,012
1923	1,155	542,227	700	898,524	4,565	853,308	912	376,167
1924	1,856	536,392	464	568,456	6,165	1,237,100	1,408	463,610
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	1,603	629,284
1926	4,805	2,562,096	354	827,213	7,263	3,127,757	1,445	661,156
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,494	728,172
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	1,597	777,128
1929	1,231	545,175	728	566,964	8,203	2,458,126	447	167,479
1929:								
July	260	86,175	49	46,440	572	180,065	14	5,807
Aug	190	80,443	58	47,769	575	171,783	—	—
Sept.	107	51,156	38	30,327	913	279,225	—	—
Oct.	200	79,968	58	43,756	636	181,421	—	—
Nov.	125	47,796	13	11,600	583	182,677	49	14,935
Dec.	100	41,328	25	19,955	550	156,939	51	12,095
1930:								
Jan.	150	55,272	28	28,549	509	141,384	—	—
Feb.	75	25,956	52	45,319	367	93,087	—	—
Mar.	148	50,007	16	12,498	522	128,844	—	—
Apr.	75	19,856	58	54,548	410	103,089	—	—

Reclaimed Rubber in the United States

(All Quantities in Long Tons—100% Basis)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks*	Year	Production	Consumption Tons	Consumption % to Crude	Stocks*
1920	86,395	75,297	28.4	.....	1925	132,930	137,105	35.6	13,203
1921	36,725	41,351	24.1	.....	1926	180,582	164,500	45.9	23,218
1922	57,334	54,458	19.3	.....	1927	189,144	178,471	47.6	24,980
1923	74,766	69,534	22.7	.....	1928	208,516	223,000	50.4	24,785
1924	80,079	76,072	22.4	.....	1929	218,954	226,588	48.4	27,464
1928:									
Jan.	14,862	20,140	58.5	21,941	July	17,278	19,070	51.0	17,805
Feb.	15,291	18,670	55.4	20,843	Aug.	19,049	17,890	41.7	15,881
Mar.	17,089	20,680	57.9	19,553	Sept.	18,693	17,795	44.6	17,991
Apr.	15,393	19,280	58.8	19,253	Oct.	17,182	18,420	45.1	17,026
May	18,945	20,215	54.1	18,137	Nov.	18,245	18,280	49.1	22,399
June	18,781	18,140	48.2	18,709	Dec.	17,728	14,320	45.9	24,785
1929:									
Jan.	18,685	21,068	49.1	24,394	July	18,887	20,236	48.7	19,679
Feb.	18,094	19,829	47.7	23,305	Aug.	19,787	18,230	47.6	22,309
Mar.	19,984	20,867	46.7	22,076	Sept.	18,660	17,071	49.2	24,984
Apr.	19,899	22,435	47.3	20,680	Oct.	18,865	18,744	53.8	25,117
May	20,285	23,176	47.1	19,479	Nov.	14,363	15,330	55.4	26,080
June	18,416	18,141	42.0	17,980	Dec.	13,429	11,531	49.0	27,464
1930:									
Jan.	15,010	17,454	47.6	24,241	July	.....	.....	.....	.....
Feb.	15,846	14,559	44.5	24,243	Aug.	.....	.....	.....	.....
Mar.	17,400	15,241	42.2	24,415	Sept.	.....	.....	.....	.....
Apr.	17,828	16,904	42.0	24,587	Oct.	.....	.....	.....	.....
May	.....	.....	.....	.....	Nov.	.....	.....	.....	.....
June	.....	.....	.....	.....	Dec.	.....	.....	.....	.....

*Stocks on hand at the end of month or year. Exports of reclaimed rubber, not shown in this table, amounted to 8,540 tons in 1927, 9,577 tons in 1928, and 12,369 tons in 1929.

U. S. Consumption of Gasoline

(In Barrels of 42 Gallons)

MONTHS	1929	1930	MONTHS	1929	1930
January	22,602,000	25,731,000	July	36,860,000	
February	22,776,000	26,509,000	August	37,759,000	
March	28,495,000	31,029,000	September	34,193,000	
April	32,019,000	34,549,000	October	32,816,000	
May	34,117,000		November	31,502,000	
June	33,163,000		December	26,550,000	

REVIEW DESK

Books, New Publications, Catalogues, Etc.

RUBBER-TEXTILE SYMPOSIUM. Reprinted from THE RUBBER AGE. Published by the Binney & Smith Company, 41 East 42nd Street, New York City. June, 1930. 36 pp. For free distribution.

"In rubber technology, as elsewhere, some of the richest finds have been made by those who have dared to paddle more than their own canoe!" says W. B. Wiegand, chairman of the New York Rubber Group, in a foreword to these papers. "The art and the science of the textile technologist have added much and will add more to the fullest understanding and the most economical employment of rubber products." The six papers, all of which were presented at a New York Group meeting on December 16, 1929, cover the use of rubber-fabric combinations in footwear, in balloon materials and in transmission belting, the use of rubber-pyroxylin textile combinations, the strength and stretch of double texture rubber goods, and the effect of rubber proofing process on the tensile strength of fabric, while the authors include Arnold R. Davis, R. P. Dinsmore, K. E. Burgess, W. L. Sturtevant, D. P. Weisberg, T. M. Knowland and A. R. Lewis.

SURFACE PYROMETERS. Published by the Cambridge Instrument Company, Inc., Grand Central Terminal, New York City. 1930. 8 pp. For free distribution.

Modern industry has long needed an accurate and rapid means for determining the temperature of flat and curved surfaces where readings must be obtained under working conditions, whether the surfaces are stationary or in motion. In the rubber industry, for example, skill in judging the heat of mill and calender rolls is difficult to acquire, yet essential to good operation. The purpose of this illustrated pamphlet is to explain how surface pyrometers help solve these difficulties.

BUS AND TRUCK TUBES. Published by the Rubber Chemicals Section, E. I. du Pont de Nemours & Company, Wilmington, Del. 1930. 8 pp. For free distribution.

The authors of this laboratory report are of the opinion that in the case of bus and truck tires an aging test in air at 90 degrees or 100 degrees Centigrade while the stock is under tension produces the best approximation to the type of deterioration that occurs in service. The paper gives the results of a series of aging tests under 50 per cent elongation at 100 degrees Centigrade, including a comparison of several anti-oxidants and anti-oxidant combinations in a typical high grade truck tube compounded with zinc oxide.

CYCLE CONTROLLERS FOR TUBE MOLDS. Published by the C. J. Tagliabue Manufacturing Company, 18 Thirty-third Street, Brooklyn, N. Y. 1930. 4 pp. For free distribution.

The general adoption of individual tube molds has brought with it the need for dependable and accurate automatic cycle controllers or "timers." Time studies conducted on hand-operated and automatically controlled tube molds demonstrate that the time saved by the operator per cure, per mold totals up to a worth-while labor saving. This leaflet described and illustrates the use of such controllers.

NATIONAL RUBBER MACHINERY REVIEW. Published by the National Rubber Machinery Company, Akron, O. May, 1930. 52 pp. For free distribution.

In addition to listing the company's factory and laboratory equipment, this publication announces several new machines to be introduced in the near future. It is comprehensive and attractively illustrated.

HIGHWAYS HANDBOOK. Published by the Highway Education Board, 1723 N Street, N. W., Washington, D. C. 1929 Edition. 102 pp. $.50.

This is an authoritative compilation of statistics of every type on the roadways of the country, with a chapter on uniform warning and direction signs and a nine-page bibliography. Particularly interesting is a table of the relative cost of operating an imaginary "average" automobile on various classes of roads, showing definitely how the tire and tube expense increases as the car goes from high type to intermediate type and low type roads. W. O. Rutherford, president of the Pennsylvania Rubber Company, and F. A. Seiberling, president of the Seiberling Rubber Company, are members of the Highway Education Board as representatives of the Rubber Manufacturers' Association.